2006-08 ENGINE

Engine Block - Civic (Except Hybrid)

ENGINE BLOCK (R18A1)

NOTE: Refer to the ENGINE BLOCK (GX) (SUPPLEMENT) article for additional information for the GX model.

SPECIAL TOOLS

Ref. No.	Tool Number	Description	Qty
①	07LAD-PT3010A	Oil Seal Driver	1
②	07ZAD-PNAA100	Oil Seal Driver Attachment 96	1
③	07746-0010700	Attachment, 24 x 26 mm	1
④	07749-0010000	Driver	1

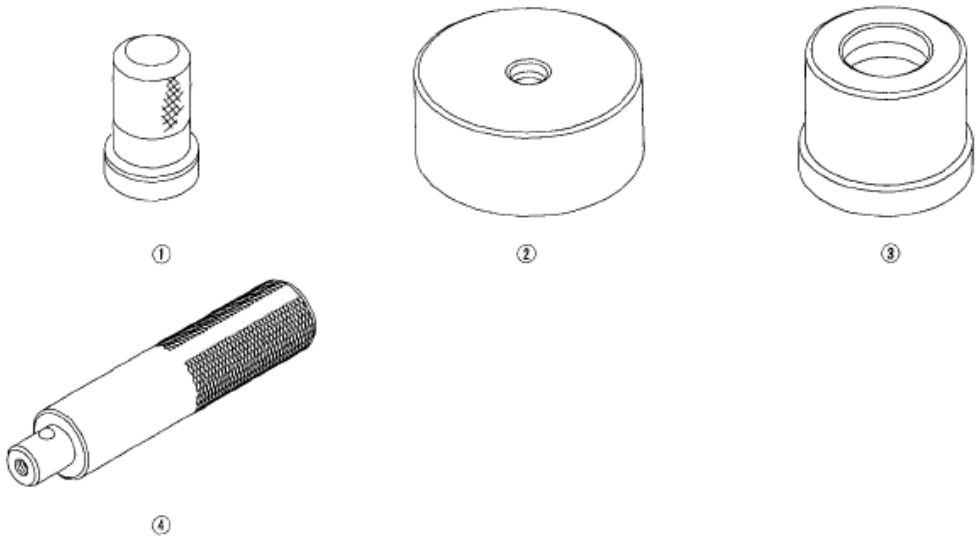


Fig. 1: Identifying Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

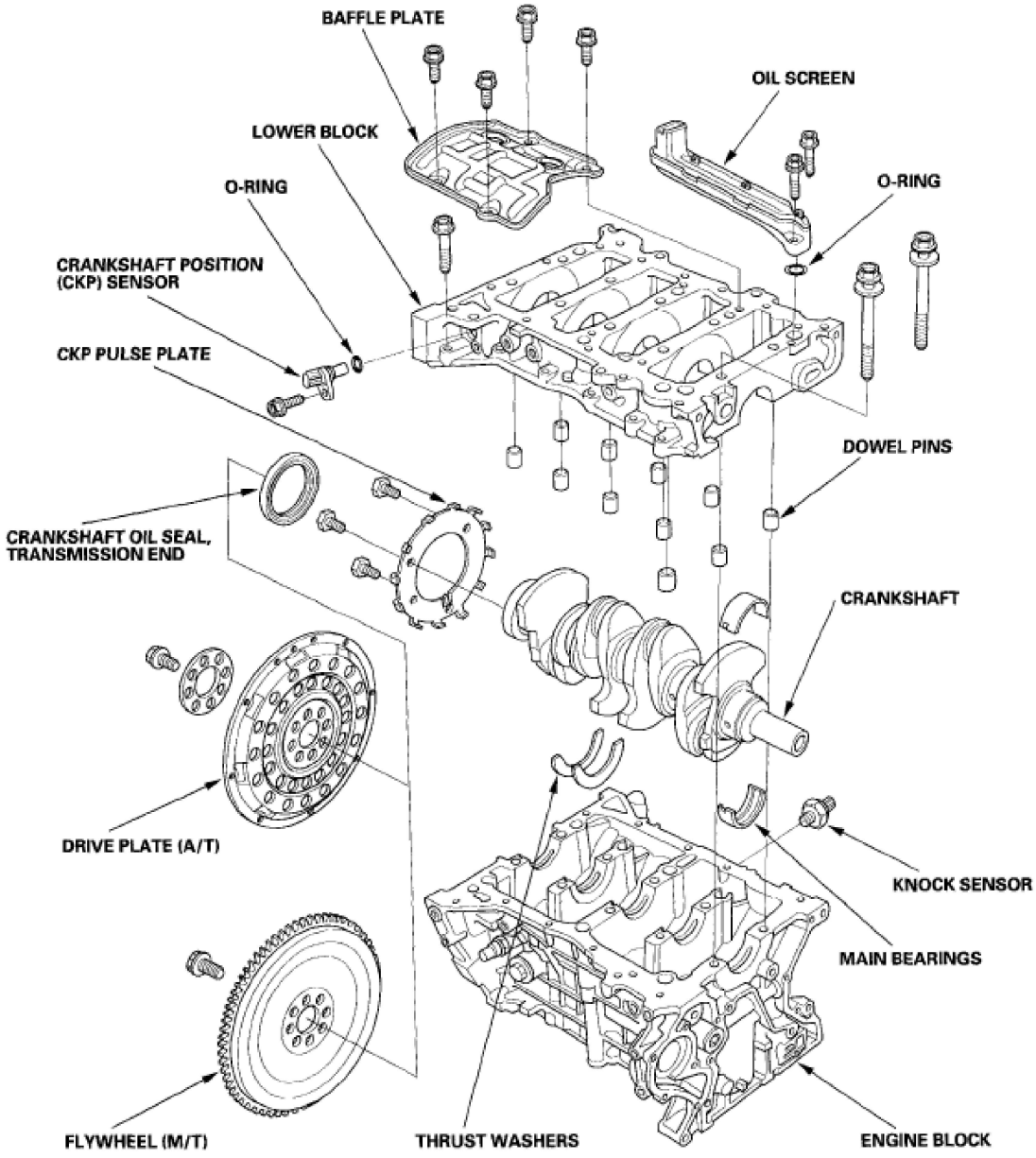


Fig. 2: Identifying Engine Block, Flywheel And Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

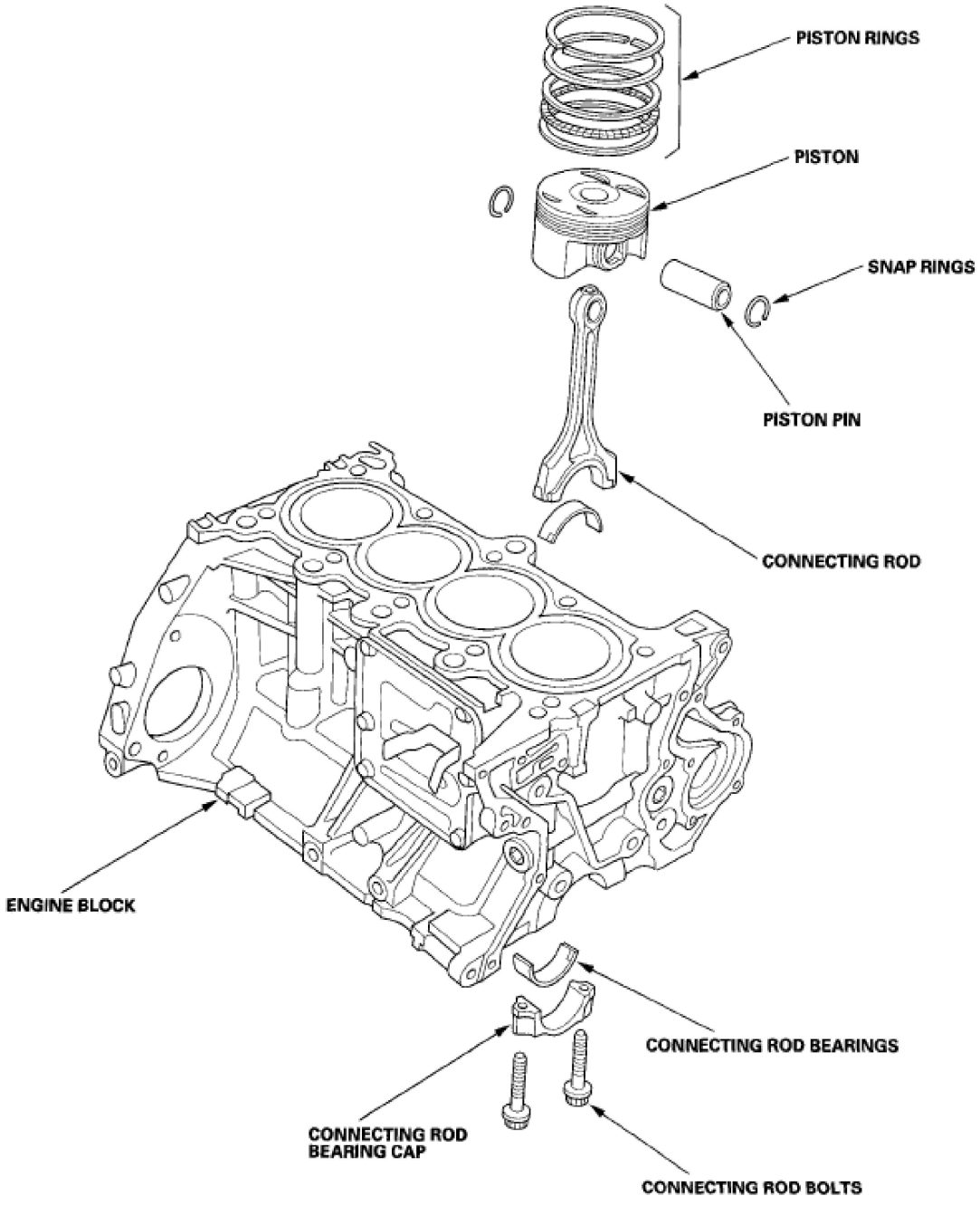


Fig. 3: Identifying Engine Block , Piston And Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pan (see **OIL PAN REMOVAL**).
2. Remove the oil screen and baffle plate (see step 8).

3. Measure the connecting rod end play with a feeler gauge between the connecting rod and crankshaft.

   Connecting Rod End Play

   Standard (New): 0.15-0.35 mm (0.006-0.014 in.)

   Service Limit: 0.45 mm (0.018 in.)

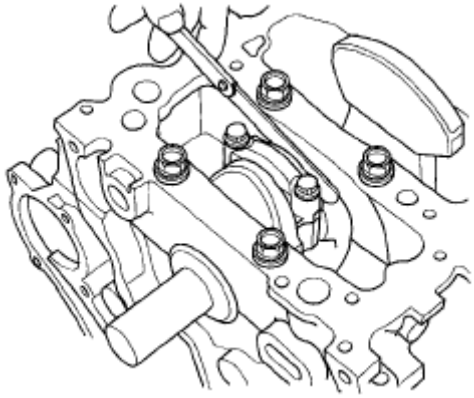


Fig. 4: Measuring Connecting Rod End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. If the connecting rod end play is beyond the service limit, install a new connecting rod, and recheck. If it is still beyond the service limit; replace the crankshaft (see **CRANKSHAFT AND PISTON REMOVAL**).
5. Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; the dial reading should not exceed the service limit.

   Crankshaft End Play

   Standard (New): 0.10-0.35 mm (0.004-0.014 in.)

   Service Limit: 0.45 mm (0.018 in.)

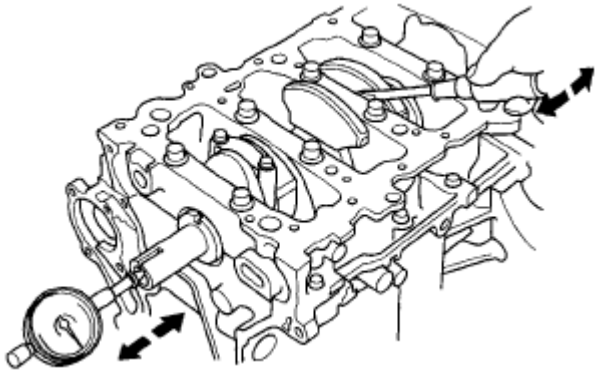


Fig. 5: Pushing Crankshaft Firmly Away From Dial Indicator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the end play is beyond the service limit, replace the thrust washers and recheck, if it is still beyond the service limit, replace the crankshaft (see **CRANKSHAFT AND PISTON REMOVAL**).

CRANKSHAFT MAIN BEARING REPLACEMENT

Main Bearing Clearance Inspection

1. To check the main bearing-to-journal oil clearance, remove the lower block and bearing halves (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.
4. Reinstall the bearings and lower block, then torque the bolts to 25 N-m (2.5 kgf-m, 18 lbf-ft) + 57 degrees in the proper sequence (see step 19).

NOTE: Do not rotate the crankshaft during inspection.

5. Remove the lower block and bearings again, and measure the widest part of the plastigage.

Main Bearing-to-Journal Oil Clearance

Standard (New): 0.018 - 0.034 mm (0.0007 - 0.0013 in.)

Service Limit: 0.045 mm (0.0018 in.)

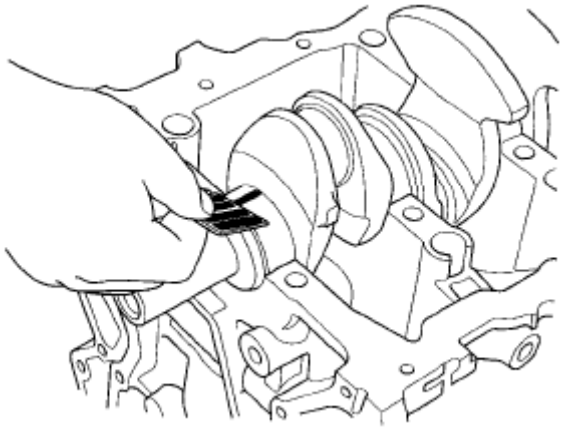


Fig. 6: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code(s), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below the current one), and check again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft, and start over.

Main Bearing Selection

Crankshaft Bore Code Location

1. Numbers, letters or bars have been stamped on the either side of the block end as a code for the size of each of the five main journal bores. Write down the crank bore codes.

   If you can't read the codes because of accumulated dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

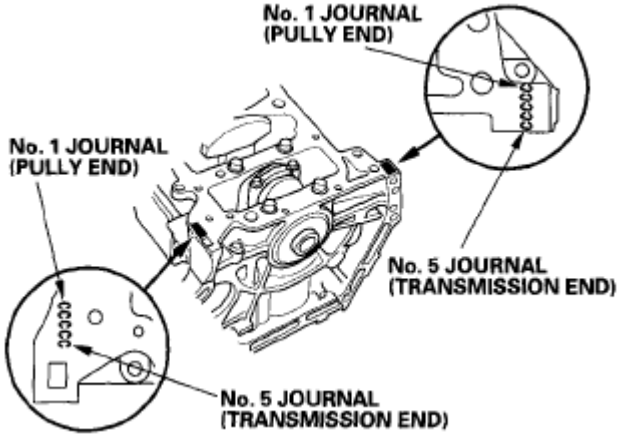


Fig. 7: Identifying Crankshaft Bore Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Main Journal Code Location

2. The main journal codes are stamped on the crankshaft.

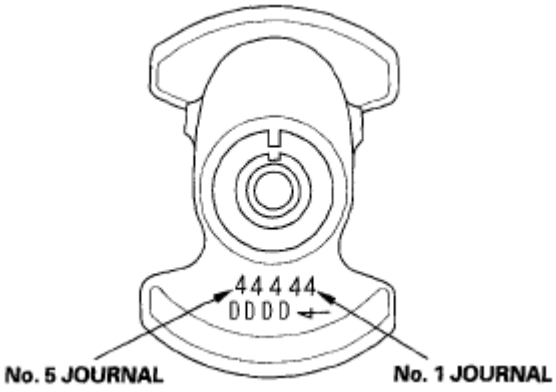


Fig. 8: Identifying Main Journal Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Use the crank bore codes and crank journal codes to select the appropriate replacement bearings from the following table.

NOTE:

- **Color code is on the edge of the bearing.**
- **When using bearing halves of different colors, it does not matter which color is used in the top or bottom.**

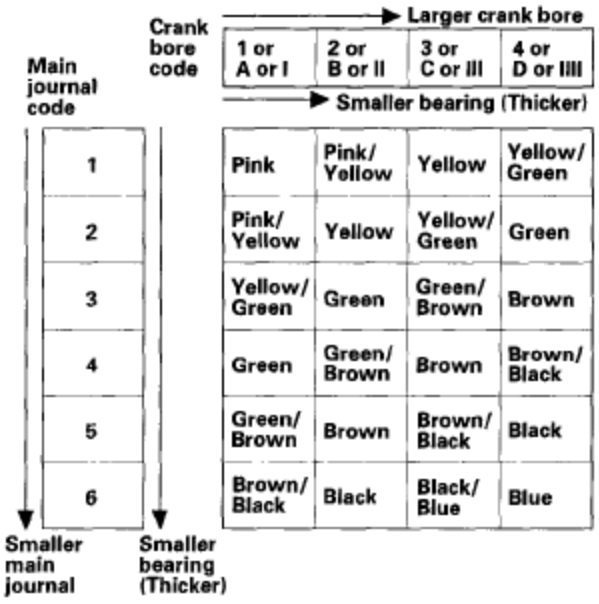


Fig. 9: Identifying Crank Bore Codes And Crank Journal Codes Reference
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

Rod Bearing Clearance Inspection

1. Remove the oil pan (see **OIL PAN REMOVAL**).
2. Remove the oil screen and baffle plate (see step 8).
3. Remove the connecting rod cap and bearing half.
4. Clean the crankshaft rod journal and bearing half with a clean shop towel.
5. Place plastigage across the rod journal.
6. Reinstall the bearing half and cap, and torque the bolts to 20 N.m (2.0 kgf.m, 14 lbf.ft) + 90 degrees using a commercially available torque angle gauge.

NOTE: Do not rotate the crankshaft during inspection.

7. Remove the rod cap and bearing half, and measure the widest part of the plastigage.

Connecting Rod Bearing-to-Journal Oil Clearance

Standard (New): 0.024-0.042 mm (0.0009-0.0017 in.)

Service Limit: 0.055 mm (0.0022 in.)

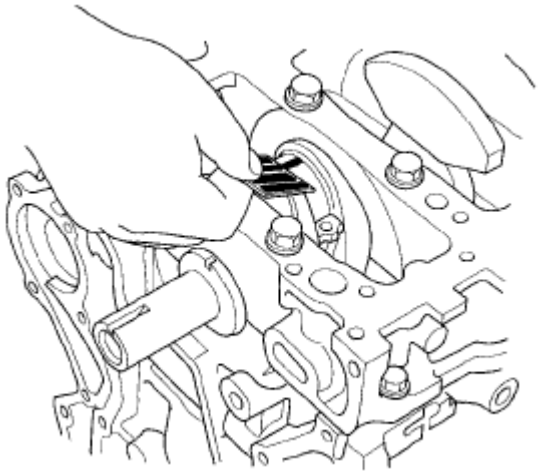


Fig. 10: Measuring Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code(s), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
9. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below the current one), and check clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearing, replace the crankshaft, and start over.

Rod Bearing Selection

1. Inspect each connecting rod for cracks and heat damage.

Connecting Rod Big End Bore Code Locations

2. Each rod has a tolerance range from 0 to 0.024 mm (0.0009 in.), in 0.006 mm (0.0002 in.) increments, depending on the size of its big end bore. It is then stamped with a number or bar (1, 2, 3 or 4/I, II, III, or MM) indicating the range. You may find any combination of numbers and bars in any engine. (Half

the number or bar is stamped on the bearing cap, the other half is on the rod.)

If you can't read the code because of an accumulation of oil and varnish, do not scrub it with a wire brush or scraper. Clean it only with solvent or detergent.

Normal Bore Size: 48.0 mm (1.89 in.)

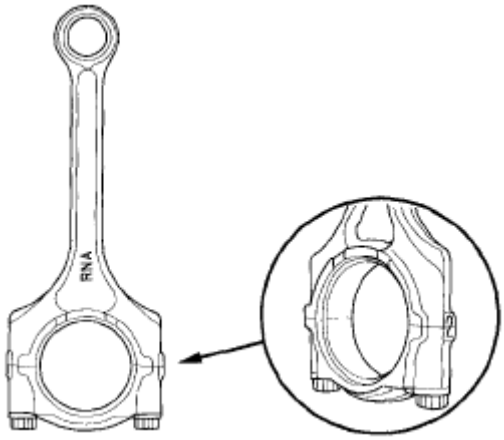


Fig. 11: Identifying Connecting Rod Big End Bore Code Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Connecting Rod Journal Code Location

3. The connecting rod journal codes are stamped on the crankshaft.

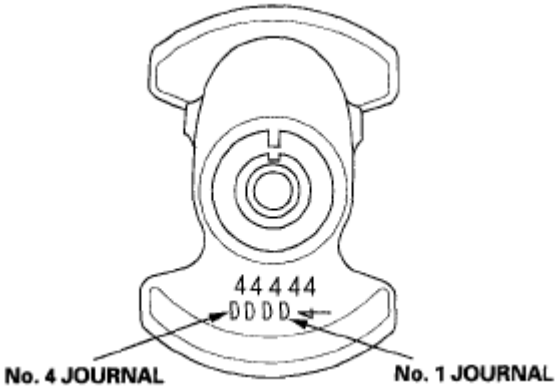


Fig. 12: Identifying Connecting Rod Journal Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Use the big end bore codes and rod journal codes to select the appropriate

replacement bearings from the following table.

NOTE:

- **Color code is on the edge of the bearing.**
- **When using bearing halves of different colors, it does not matter which color is used in the top or bottom.**

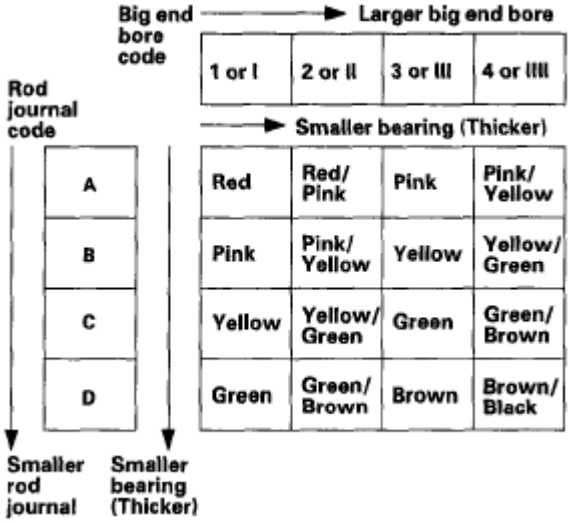


Fig. 13: Identifying Big End Bore Codes And Rod Journal Codes Reference
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PAN REMOVAL

1. If the engine is already out of the vehicle, go to step 12.
2. Remove the drive belt (see **DRIVE BELT INSPECTION**).
3. Remove the A/C condenser fan shroud (see **A/C COMPRESSOR REPLACEMENT**).
4. Disconnect the A/C compressor clutch connector, then remove the harness clamp. Remove the A/C compressor without disconnecting the A/C hoses (see step 39 on **ENGINE REMOVAL**).
5. Raise the vehicle on the hoist to full height.
6. Remove the splash shield (see step 23 on **ENGINE REMOVAL**).
7. Drain the engine oil (see **ENGINE OIL REPLACEMENT**).

8. Remove exhaust pipe A (see step 27 on **ENGINE REMOVAL**).
9. Support the oil pan with a jack.
10. Remove the lower torque rod (see step 46 on **ENGINE REMOVAL**).
11. Remove the jack.
12. Remove the lower torque rod bracket.

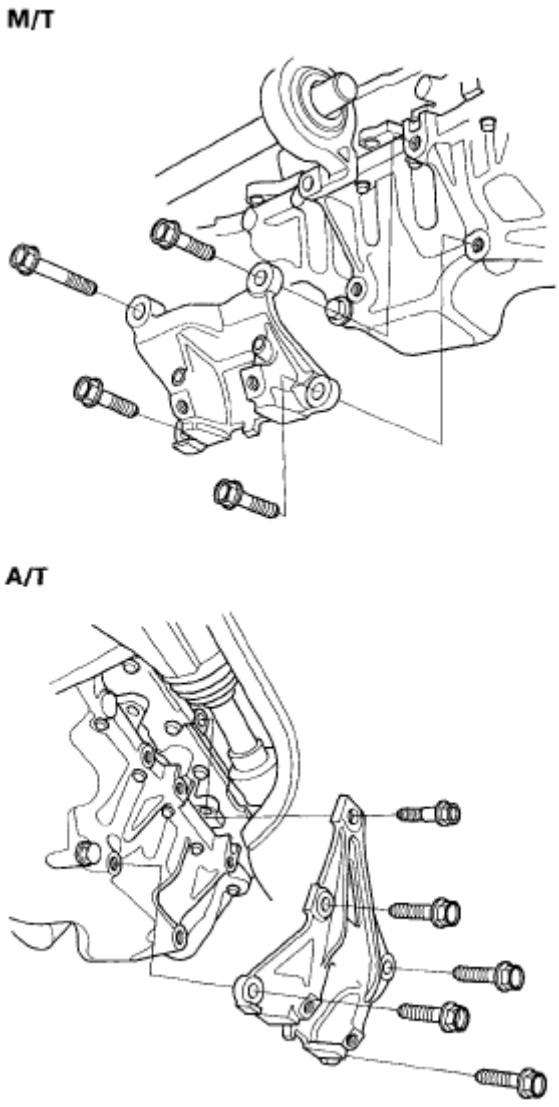


Fig. 14: Identifying Lower Torque Rod Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the A/C compressor bracket.

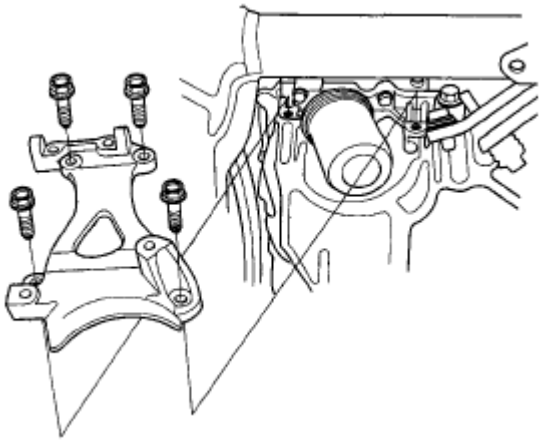


Fig. 15: Identifying A/C Compressor Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. A/T model: Remove the shift cable cover.

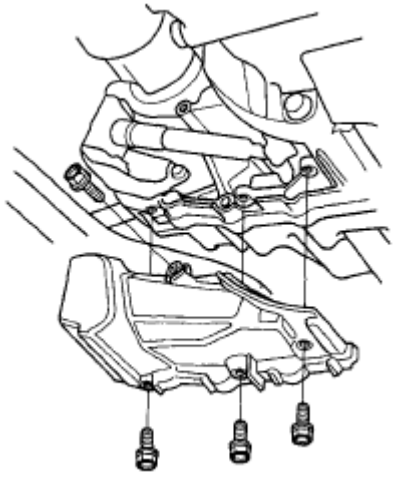


Fig. 16: Identifying Shift Cable Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the clutch cover/torque converter cover (A), and remove the two bolts securing the transmission.

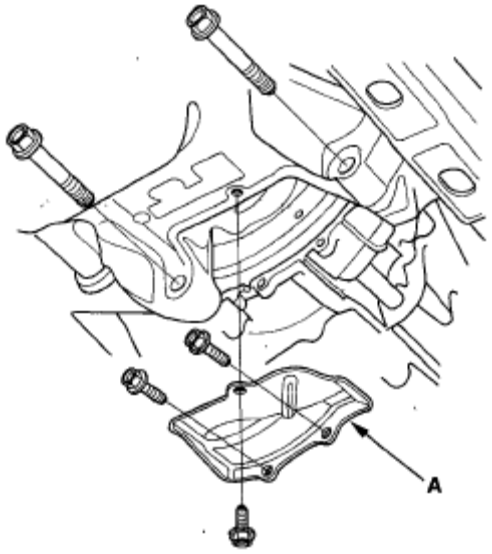


Fig. 17: Identifying Clutch Cover/Torque Converter Cover
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Remove the bolts securing the oil pan.
17. Using a flat blade screwdriver, separate the oil pan from the block in the places shown.

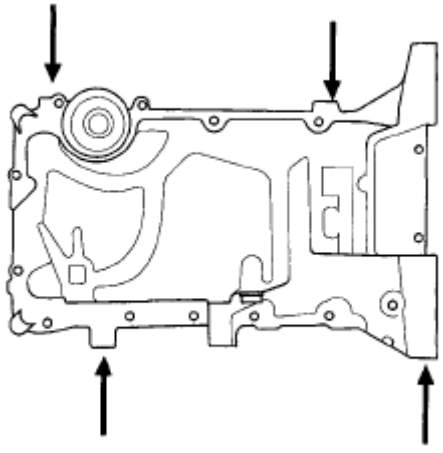


Fig. 18: Identifying Oil Pan From Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine assembly (see **ENGINE REMOVAL**).
2. Remove the transmission:
   - Manual transmission (see **TRANSMISSION REMOVAL**)
   - Automatic transmission (see **TRANSMISSION REMOVAL**)
3. M/T model: Remove the pressure plate, clutch disc and flywheel (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (5-SPEED MODEL)**).
4. A/T model: Remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
5. Remove the oil pan (see **OIL PAN REMOVAL**).
6. Remove the oil pump (see **REMOVAL**).
7. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
8. Remove the oil screen (A) and baffle plate (B).

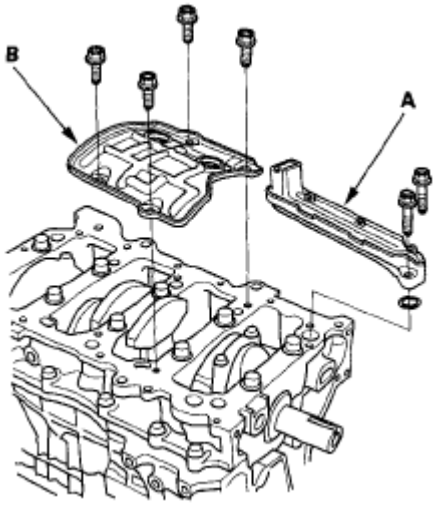


Fig. 19: Identifying Oil Screen And Baffle Plate
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the 8 mm bolts.

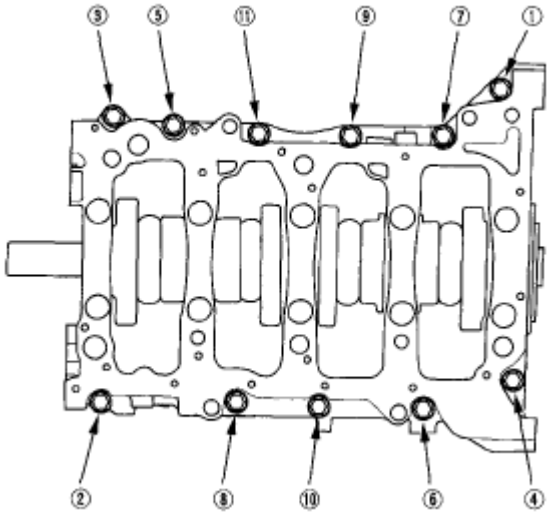


Fig. 20: Identifying Baffle Plate And Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the bearing cap bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

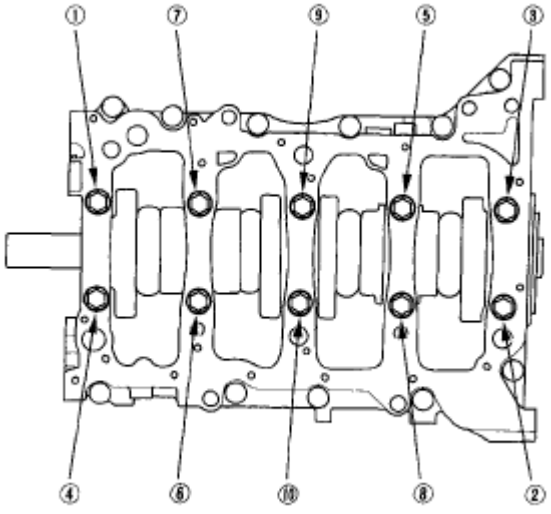


Fig. 21: Identifying Bearing Cap Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Using a flat blade screwdriver, separate the lower block from the engine block in the places shown.

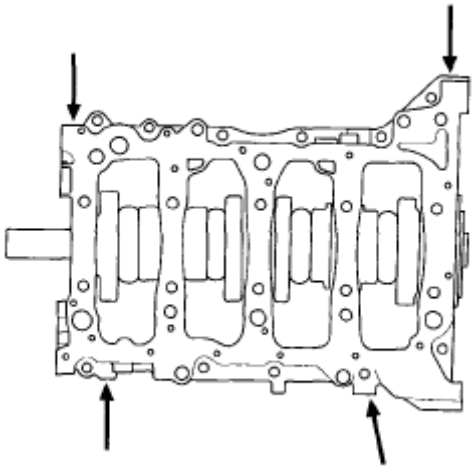


Fig. 22: Identifying Lower Block From Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

12. Remove the lower block and bearings. Keep all the bearings in order.
13. Remove the rod caps/bearings. Keep all caps/bearings in order.
14. Lift the crankshaft (A) out of the engine. Be careful not to damage the journals and the crankshaft position (CKP) pulse plate (B).

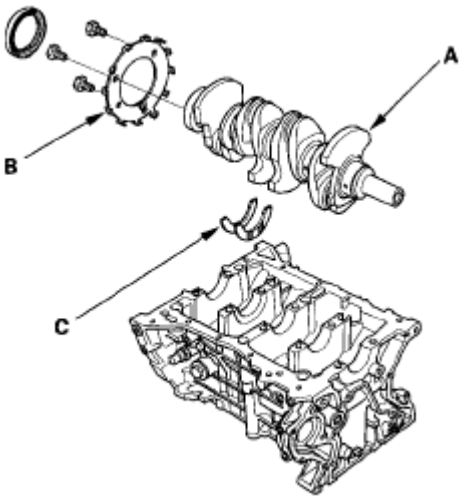


Fig. 23: Identifying Crankshaft Position (CKP) Pulse Plate And Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Remove the CKP pulse plate (B).
16. Remove the thrust washers (C).

17. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
18. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer (A). Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the pistons as they are pushed out.

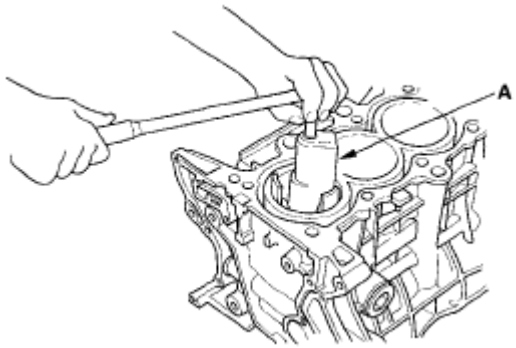


Fig. 24: Removing Upper Bearing Halves From Connecting Rods
Courtesy of AMERICAN HONDA MOTOR CO., INC.

19. Use the wooden handle of a hammer (A) to drive out the piston/connecting rod assembly (B). Take care not to damage the oil jets or cylinder with the connecting rod.

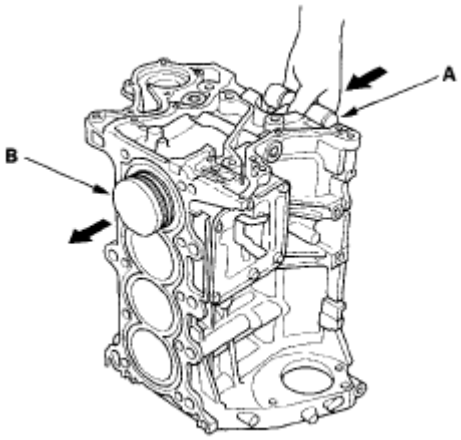


Fig. 25: Driving Out Piston/Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Reinstall the lower block and the bearings on the engine in the proper order.

21. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.
22. Mark each piston/connecting rod assembly with its cylinder number to make sure they are reused in the original order.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

CRANKSHAFT INSPECTION

Out-of-Round and Taper

1. Remove the crankshaft from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
3. Clean the keyway and the threads.
4. Measure the out-of-round at the middle of each rod and main journal in two places. The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round

Standard (New): 0.005 mm (0.0002 in.) max.

Service Limit: 0.010 mm (0.0004 in.)

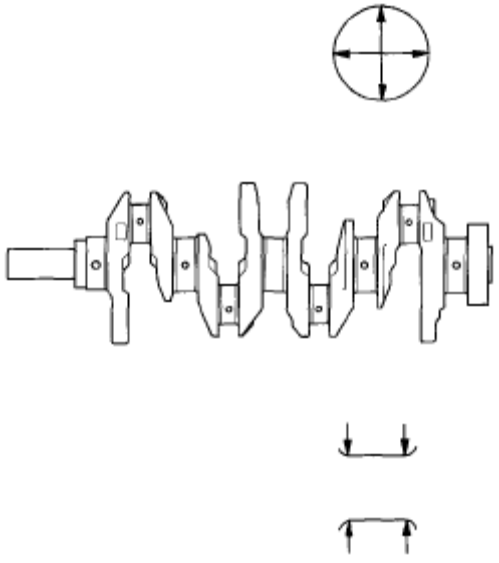


Fig. 26: Identifying Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the taper at the edges of each rod and main journal. The difference between measurements on each journal must not be more than the service limit.

   Journal Taper

   Standard (New): 0.005 mm (0.0002 in.) max.

   Service Limit: 0.010 mm (0.0004 in.)

   Straightness

6. Place the engine block on the surface plate.
7. Clean and install the bearings on the No. 1 and No. 5 journals of the engine block.
8. Lower the crankshaft into the block.
9. Measure the runout on all of the main journals. Rotate the crankshaft two complete revolutions. The difference between measurements on each journal must not be more than the service limit.

   Crankshaft Total Runout

Standard (New): 0.03 mm (0.0012 in.) max.

Service Limit: 0.04 mm (0.0016 in.)

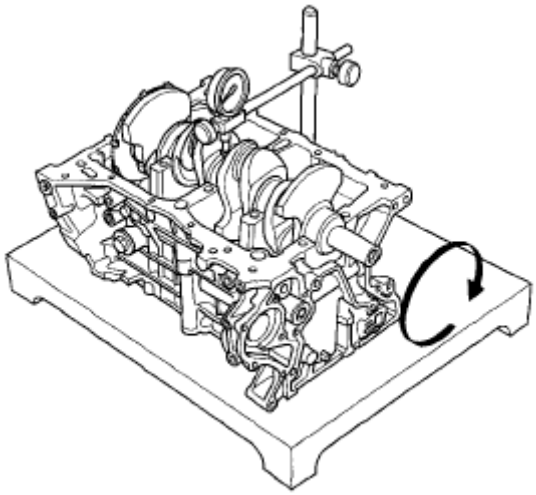


Fig. 27: Measuring Runout On Of Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLOCK AND PISTON INSPECTION

1. Remove the crankshaft and pistons (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Check the piston for distortion or cracks.
3. Measure the piston diameter at a point 14 mm (0.55 in.) from the bottom of the skirt.

Piston Diameter

Standard (New): 80.980-80.990 mm (3.1881-3.1886 in.)

Service Limit: 80.93 mm (3.186 in.)

Oversize Piston Diameter

0.25: 81.230-81.240 mm (3.1980-3.1984 in.)

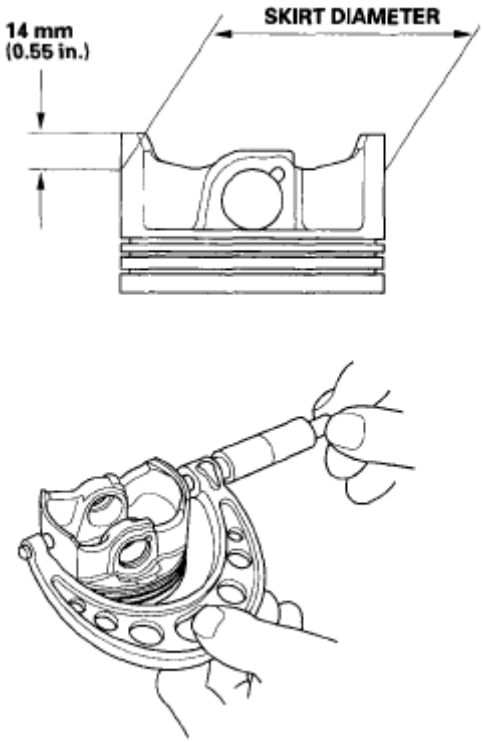


Fig. 28: Measuring Piston Diameter Point From Bottom Of Skirt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the wear and taper Y at three levels inside each cylinder as shown. If the measurements in any cylinder are beyond the Oversize Bore Service Limit, replace the engine block. If the engine block is being rebored, refer to step 7 after reboring.

   Cylinder Bore Size

   Standard (New): 81.000-81.015 mm (3.1890-3.1896 in.)

   Service Limit: 81.070 mm (3.1917 in.)

   Oversize Bore

   0.25: 81.250-81.265 mm (3.1988-3.1994 in.)

   Reboring limit: 0.25 mm (0.01 in.) max.

   Bore Taper

Limit: (Difference between first and third measurement) 0.05 mm (0.002 in.)

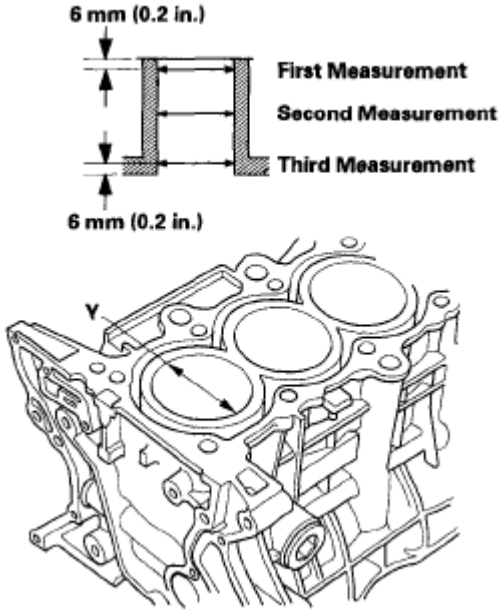


Fig. 29: Identifying Wear And Taper At Three Levels Inside Each Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Scored or scratched cylinder bores must be honed.
6. Check the top of the engine block for warpage. Measure along the edges, and across the center as shown.

Engine Block Warpage

Standard (New): 0.07 mm (0.003 in.) max.

Service Limit: 0.10 mm (0.004 in.)

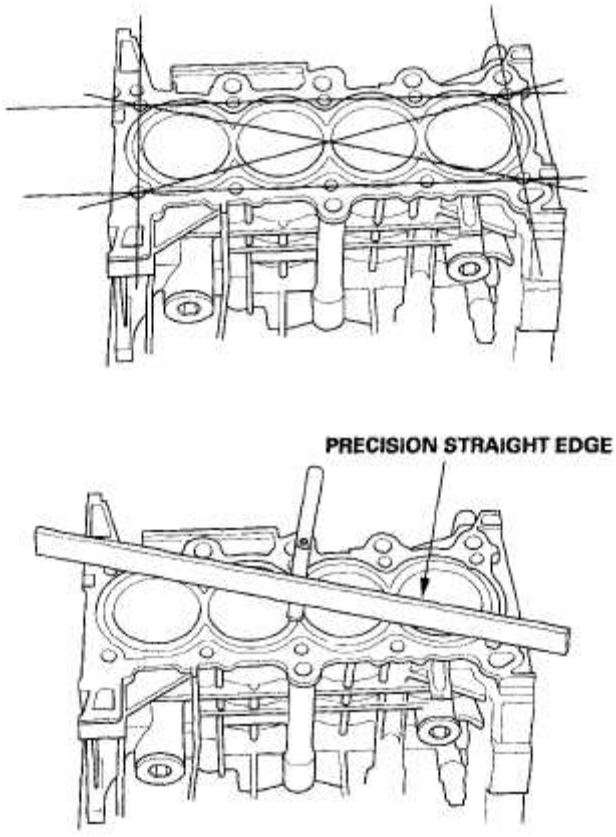


Fig. 30: Identifying Top Of Engine Block For Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Calculate the difference between the cylinder bore diameter and the piston diameter. If the clearance is near, or exceeds the service limit, inspect the piston and engine block for excessive wear.

   Piston-to-Cylinder Bore Clearance

   Standard (New): 0.010-0.035 mm (0.0004-0.0014 in.)

   Service Limit: 0.05 mm (0.002 in.)

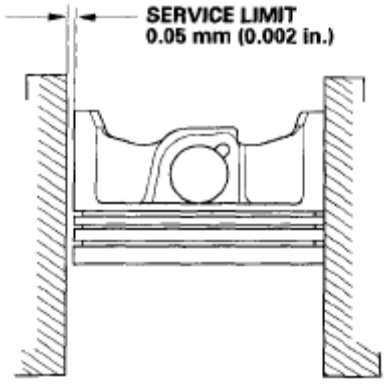


Fig. 31: Identifying Calculate Difference Between Cylinder Bore Diameter And Piston Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

Only a scored or scratched cylinder bore must be honed.

1. Measure the cylinder bores (see **BLOCK AND PISTON INSPECTION**). If the engine block is to be reused, hone the cylinders, and remeasure the bores.
2. Remove and replace the oil jets (see **OIL JET REPLACEMENT**).
3. Hone the cylinder bores with honing oil and a fine (400 grit) stone.

Honing Pattern: Within 30-60 degree cross-hatch pattern (A)

NOTE: Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent. Do not use stones that are worn or broken.

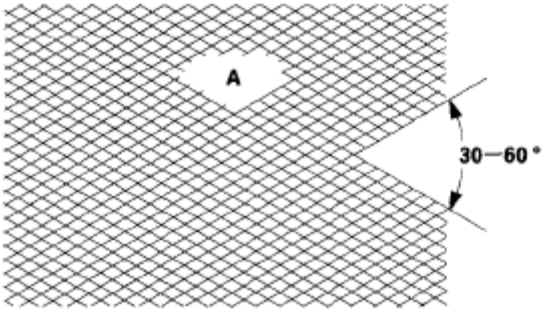


Fig. 32: Identifying Honing Pattern

Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil them immediately to prevent rusting. Never use solvent, it will only redistribute the grit on the cylinder walls.
5. If scoring or scratches are still present in the cylinder bores after honing the engine block to the service limit, rebore the engine block. Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail, and does not run the full length of the bore.
6. Install the new oil jets (see **OIL JET REPLACEMENT**).

PISTON, PIN, AND CONNECTING ROD REPLACEMENT

Disassembly

1. Remove the piston from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Apply new engine oil to the piston pin snap rings (A), and turn them in the ring grooves until the end gaps are lined up with the cutouts in the piston pin bores (B).

NOTE: Take care not to damage the ring grooves.

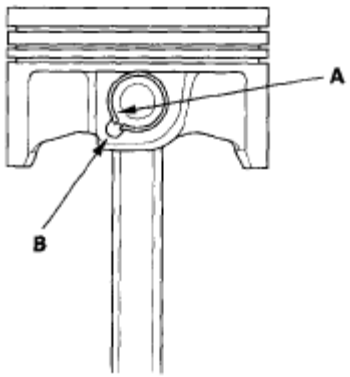


Fig. 33: Identifying Piston Pin Snap Rings And Piston Pin Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove both snap rings (A). Start at the cutout in the piston pin bore. Remove

the snap rings carefully so they do not go flying or get lost. Wear eye protection.

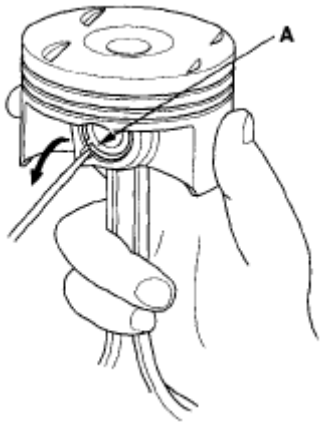


Fig. 34: Removing Both Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Heat the piston and connecting rod assembly to about 158°F (70°C), then remove the piston pin.

Fig. 35: Heating Piston And Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Inspection

NOTE: Inspect the piston, piston pin, and connecting rod when they are at room temperature.

1. Measure the diameter of the piston pin.

   Piston Pin Diameter

   Standard (New): 19.960-19.964 mm (0.7858-0.7860 in.)

   Service Limit: 19.960 mm (0.7858 in.)

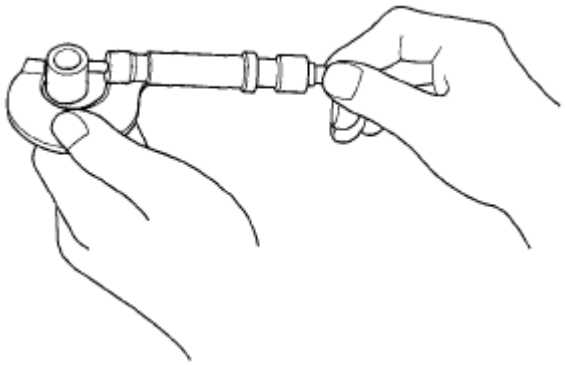


Fig. 36: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Zero the dial indicator to the piston pin diameter.

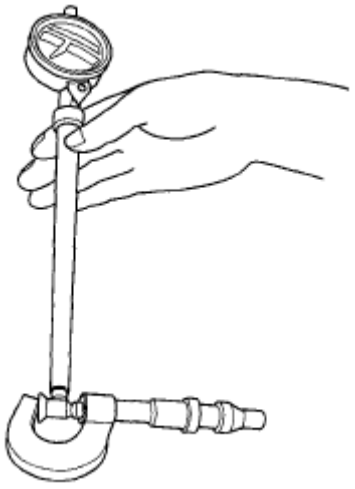


Fig. 37: Identifying Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Check the difference between the piston pin diameter and piston pin hole

diameter in the piston.

Piston Pin-to-Piston Clearance

Standard (New): -0.004 to +0.003 mm (-0.00016 to +0.00012 in.)

Service Limit: 0.006 mm (0.0002 in.)

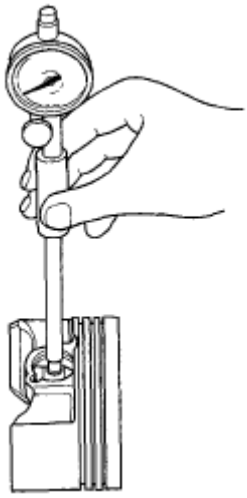


Fig. 38: Checking Difference Between Piston Pin Diameter And Piston Pin Hole Diameter In Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the piston pin-to-connecting rod clearance.

   Piston Pin-to-Connecting Rod Clearance

   Standard (New): 0.005-0.015 mm (0.0002-0.0006 in.)

   Service Limit: 0.02 mm (0.0008 in.)

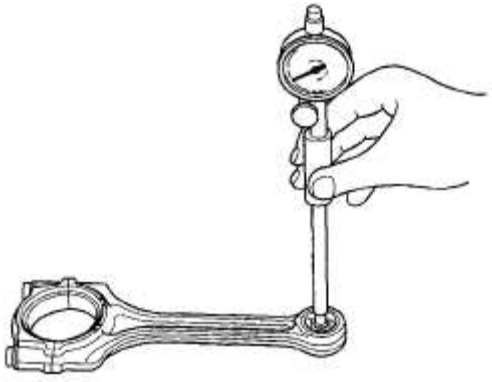


Fig. 39: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly

1. Install one piston pin snap ring (A).

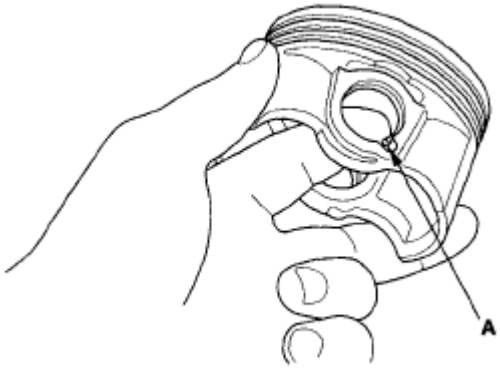


Fig. 40: Installing Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Coat the piston pin bore, the bore in the connecting rod, and the piston pin with new engine oil.
3. Heat the piston to about 158°F (70°C).

Fig. 41: Heating Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Assemble the piston (A) and connecting rod (B) with the mark (C) and the embossed mark (D) on the same side. Install the piston pin (E).

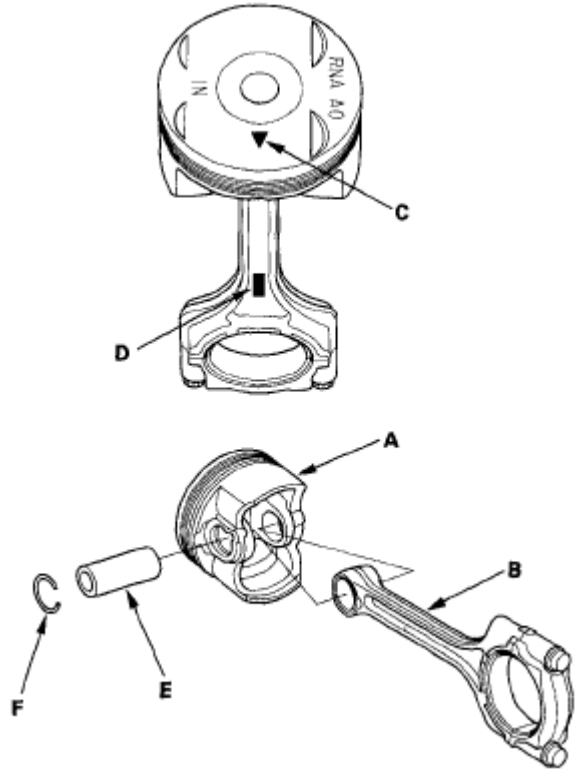


Fig. 42: Identifying Piston And Connecting Rod With Mark
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the remaining snap ring (F).
6. Turn the snap rings until the end gaps are positioned at the bottom of the piston.

PISTON RING REPLACEMENT

1. Remove the piston from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Using a ring expander (A), remove the old piston rings (B).

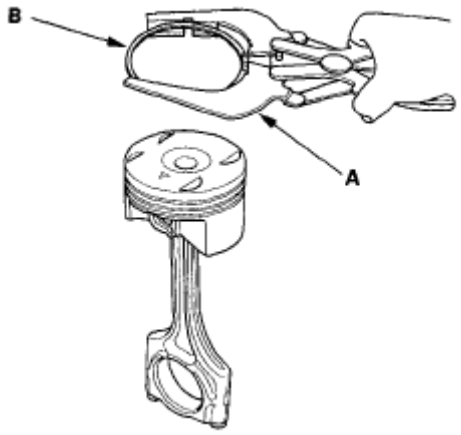


Fig. 43: Removing Old Piston Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all ring grooves thoroughly with a squared-off broken ring or ring groove cleaner with a blade to fit the piston grooves.

   The top and 2nd ring grooves are 1.2 mm (0.05 in.) wide. The oil ring groove is 2.0 mm (0.08 in.) wide. File down a blade if necessary. Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tools.

   NOTE: If the piston is to be separated from the connecting rod, do not install new rings yet.

4. Using a piston that has its rings removed, push a new ring (A) into the cylinder bore 15-20 mm (0.6-0.8 in.) from the bottom.

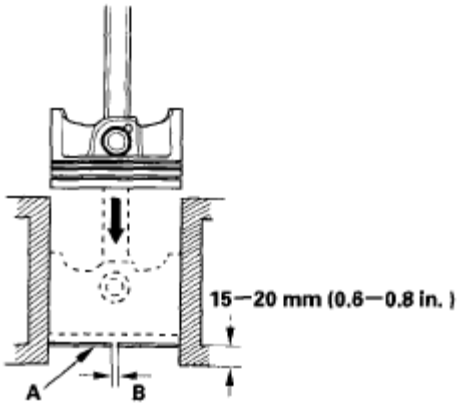


Fig. 44: Pushing Ring Into Cylinder Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) with a feeler gauge:
   - If the gap is too small, check to see if you have the proper rings for your engine.
   - If the gap is too large, recheck the cylinder bore diameter against the wear limits (see **BLOCK AND PISTON INSPECTION**). If the bore is beyond the service limit, the engine block must be rebored.

Piston Ring End-Gap

Top Ring:

Standard (New): 0.20-0.35 mm (0.008-0.014 in.)

Service Limit: 0.60 mm (0.024 in.)

Second Ring:

Standard (New): 0.40-0.55 mm (0.016-0.022 in.)

Service Limit: 0.70 mm (0.028 in.)

Oil Ring:

Standard (New): 0.20-0.70 mm (0.008-0.028 in.)

Service Limit: 0.80 mm (0.031 in.)

6. Install the top ring and the second ring as shown. The top ring (A) has a 1T, 1A, or 1R mark, and the second ring (B) has a 2T, 2A, or 2R mark. The manufacturing marks (C) must be facing upward.

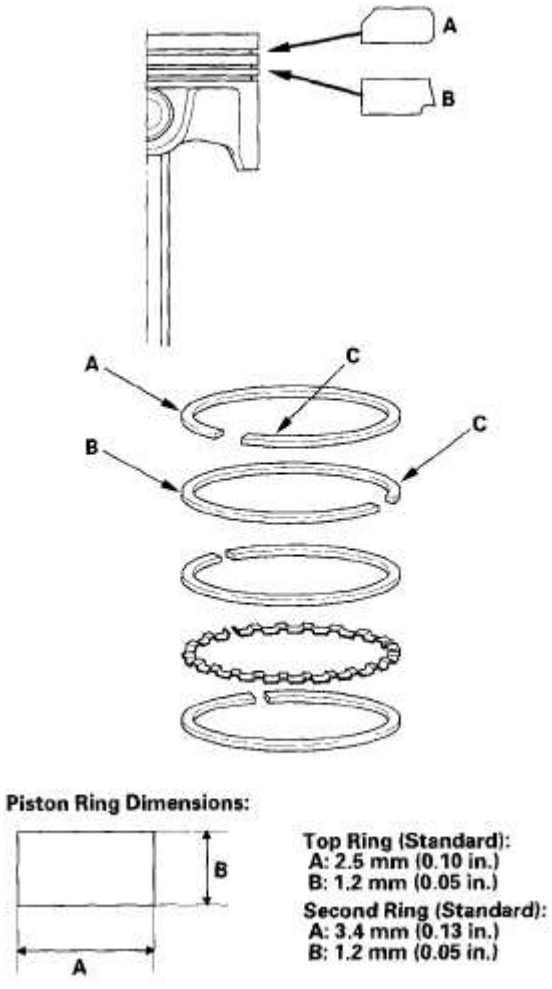


Fig. 45: Identifying Top Ring And Second Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Rotate the rings in their grooves to make sure they do not bind.
8. Position the ring end gaps as shown:

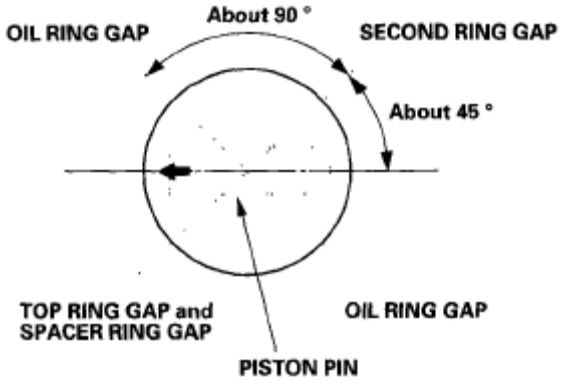


Fig. 46: Positioning Ring End Gaps
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. After installing a new set of rings, measure the ring-to-groove clearances:

   Top Ring Clearance

   Standard (New): 0.045-0.070 mm (0.0018-0.0028 in.)

   Service Limit: 0.13 mm (0.005 in.)

   Second Ring Clearance

   Standard (New): 0.035-0.060 mm (0.0014-0.0024 in.)

   Service Limit: 0.13 mm (0.005 in.)

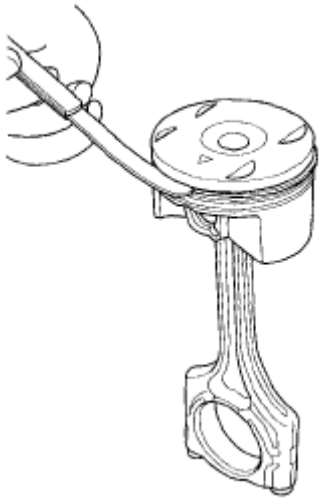


Fig. 47: Measuring Ring-To-Groove Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PISTON INSTALLATION

If the Crankshaft is Already Installed

1. Set the crankshaft to bottom dead center (BDC) for each cylinder as its piston is installed.
2. Remove the connecting rod caps, then install the ring compressor. Check that the bearing is securely in place.
3. Apply new engine oil to the piston, inside of the ring compressor, and the cylinder bore, then attach the ring compressor to the piston/connecting rod assembly.
4. Position the mark (A) to face the cam chain side of the engine.

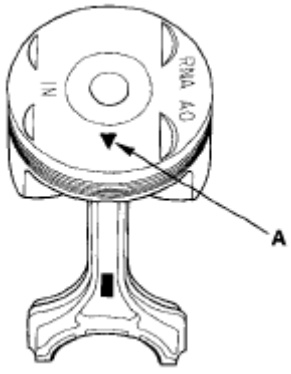


Fig. 48: Identifying Mark To Face Cam Chain Side Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A). Push down on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.

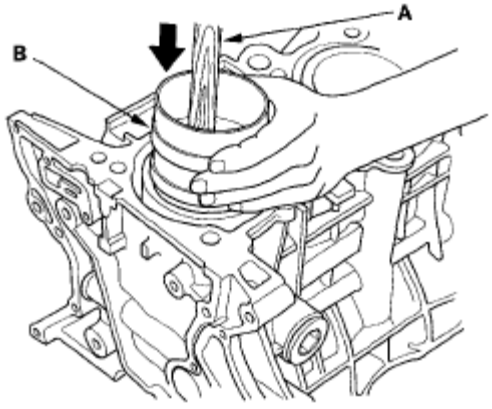


Fig. 49: Positioning Piston In Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
7. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT**).
8. Inspect the connecting rod bolts (see **CONNECTING ROD BOLT INSPECTION**).
9. Apply new engine oil to the bolt threads, then install the rod caps with bearings. Torque the bolts to 20 N.m (2.0 kgf.m, 14 lbf.ft).
10. Tighten the connecting rod bolts an additional 90 °.

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle.

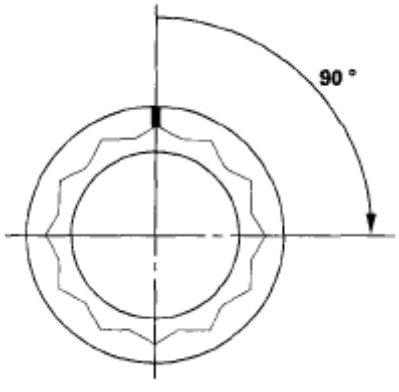


Fig. 50: Identifying Connecting Rod Bolt Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

If the Crankshaft is Not Installed

1. Remove the connecting rod caps, then install the ring compressor, and check that the bearing is securely in place.
2. Apply new engine oil to the piston, inside of the ring compressor, and the cylinder bore, then attach the ring compressor to the piston/connecting rod assembly.
3. Position the mark (A) to face the cam chain side of the engine.

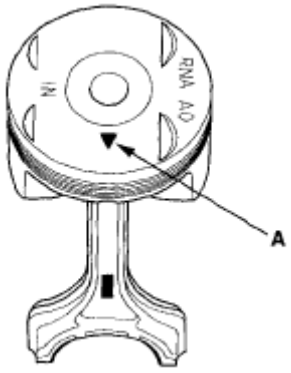


Fig. 51: Identifying Mark To Face Cam Chain Side Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A). Push down on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.

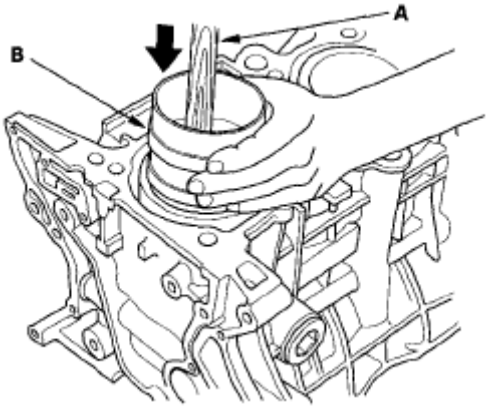


Fig. 52: Positioning Piston In Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position all pistons at top dead center (TDC).

CONNECTING ROD BOLT INSPECTION

1. Measure the diameter of each connecting rod bolt at point A and point B.

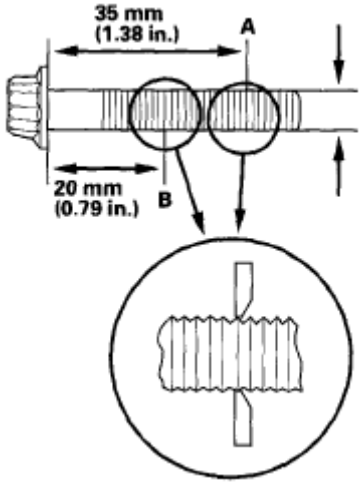


Fig. 53: Identifying Diameter Of Each Connecting Rod Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Calculate the difference in diameter between point A and point B.

   Point A-Point B = Difference in Diameter

   Difference in Diameter:

   Specification: 0-0.1 mm (0-0.004 in.)

3. If the difference in diameter is out of specification, replace the connecting rod bolt.

CRANKSHAFT INSTALLATION

Special Tools Required

- Driver 07749-0010000
- Attachment, 24 x 26 mm 07746-0010700
- Oil seal driver attachment 96 07ZAD-PNAA100

1. With a manual transmission, install the crankshaft end bushing when replacing the crankshaft. Using the special tools, drive in the crankshaft end bushing until the special tools bottom against the crankshaft.

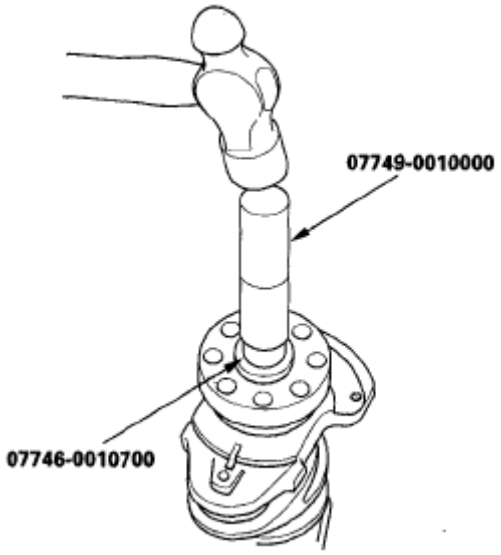


Fig. 54: Identifying Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT**).
3. Check the main bearing clearance with plastigage (see **CRANKSHAFT MAIN BEARING REPLACEMENT**).
4. Install the bearing halves in the engine block and connecting rods.
5. Apply a coat of new engine oil to the main bearings and rod bearings.
6. Install the crankshaft position (CKP) pulse plate (A) to the crankshaft (B).

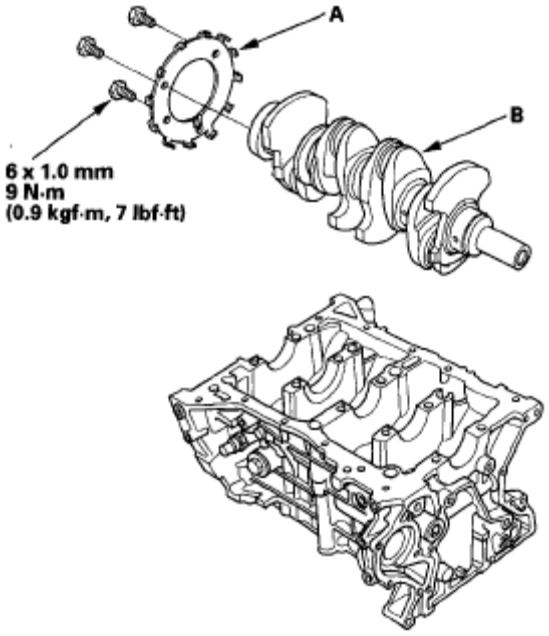


Fig. 55: Identifying Crankshaft Position (CKP) Pulse Plate To Crankshaft (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Hold the crankshaft so that rod journal No. 2 and rod journal No. 3 are straight up, and lower the crankshaft into the engine block.
8. Apply new engine oil to the thrust washer surfaces. Install the thrust washers (A) in the No. 4 journal of the engine block.

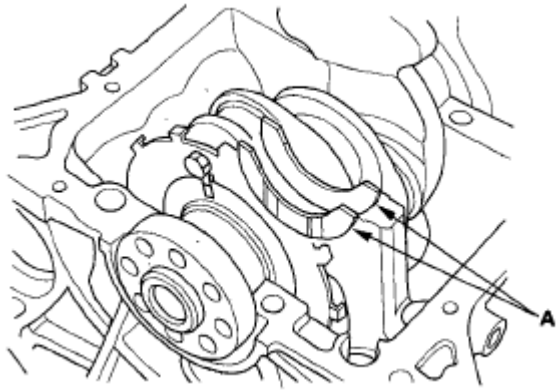


Fig. 56: Identifying Thrust Washers
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Inspect the connecting rod bolts (see **CONNECTING ROD BOLT**

INSPECTION).

10. Seat the rod journals into connecting rod No. 1 and connecting rod No. 4. Line up the mark (A) on the connecting rod and cap, then install the caps and bolts finger-tight.

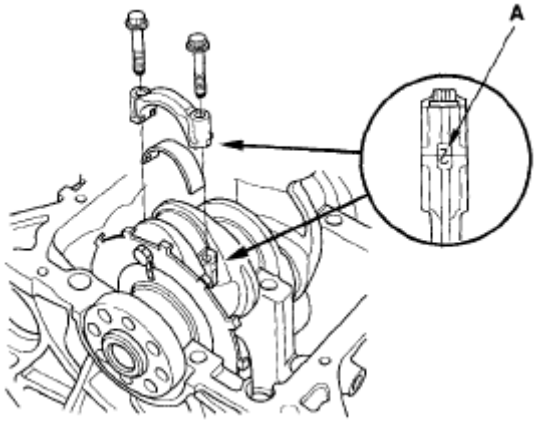


Fig. 57: Identifying Mark On Connecting Rod And Cap
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Rotate the crankshaft clockwise, and seat the journals into connecting rod No. 2 and connecting rod No. 3. Line up the mark on the connecting rod and cap, then install the caps and bolts finger-tight.
12. Tighten the connecting rod bolts to 20 N.m (2.0 kgf.m, 14 lbf.ft).
13. Tighten the connecting rod bolts an additional 90 °.

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 9 of the procedure. Do not loosen it back to the specified angle.

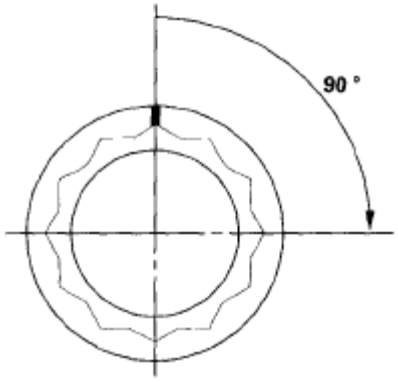


Fig. 58: Identifying Connecting Rod Bolt Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove any old liquid gasket from the lower block mating surfaces, bolts, and bolt holes.
15. Clean, and dry the lower block mating surfaces.
16. Apply liquid gasket, P/N 08717-0004,08718-0001, 08718-0002, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the lower block.

NOTE: Do not install components if too much time has passed after applying the liquid gasket (for P/N 08718-0002, no more than 4 minutes, for all others, no more than 5 minutes). Instead, remove the old residue and reapply the liquid gasket.

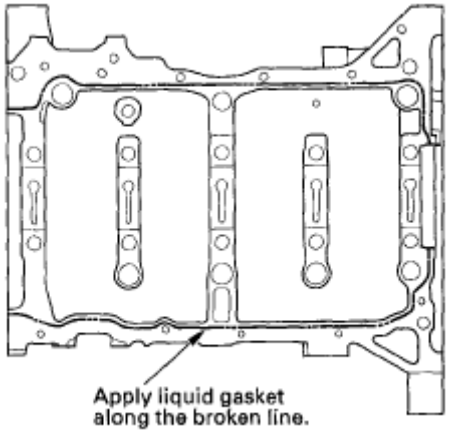


Fig. 59: Identifying Lower Block Mating Surfaces
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Put the lower block on the engine block.

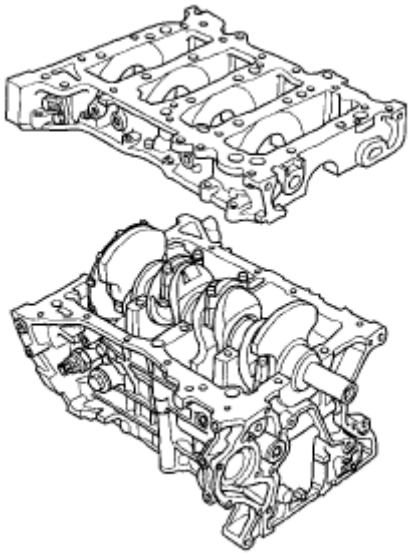


Fig. 60: Identifying Lower Block On Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Apply new engine oil to the threads and flange of the bearing cap bolts.
19. Tighten the bearing cap bolts, in sequence, to 25 N.m (2.5 kgf.m, 18 lbf.ft).

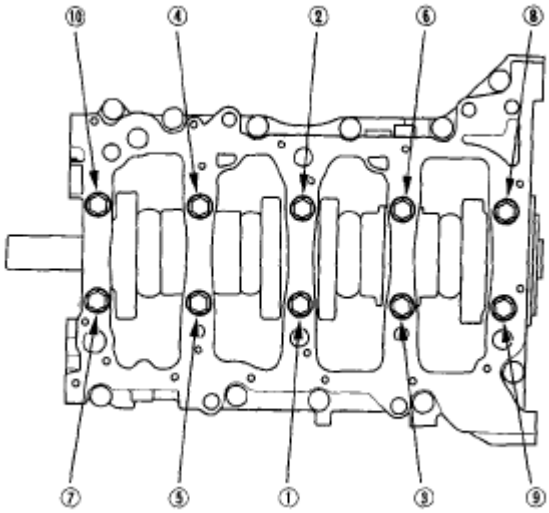


Fig. 61: Identifying Bearing Cap Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Tighten the bearing cap bolts an additional 57 degrees.

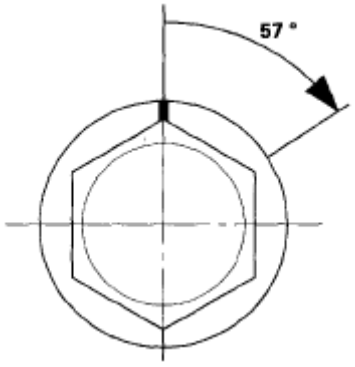


Fig. 62: Identifying Bearing Cap Bolts Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Tighten the 8 mm bolts, in sequence, to 24 N.m (2.4 kgf.m, 17 lbf-ft).

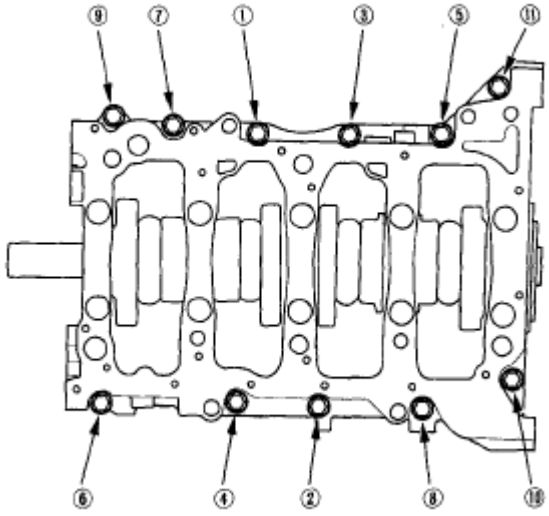


Fig. 63: Identifying Bearing Cap Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Use the special tools to drive a new oil seal squarely into the engine block to the specified installed height.

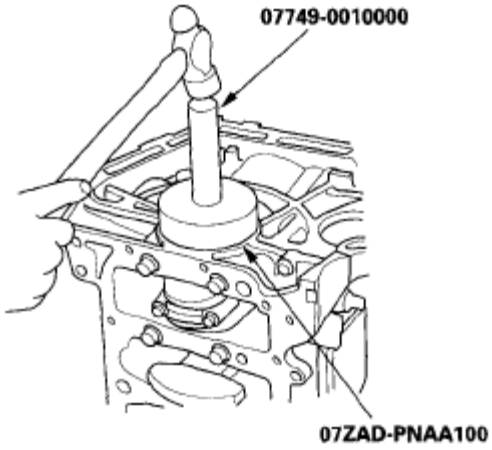


Fig. 64: Identifying Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Measure the distance between the engine block (A) and oil seal (B).

    Oil Seal Installed Height: 0.2-1.2 mm (0.001-0.047 in.)

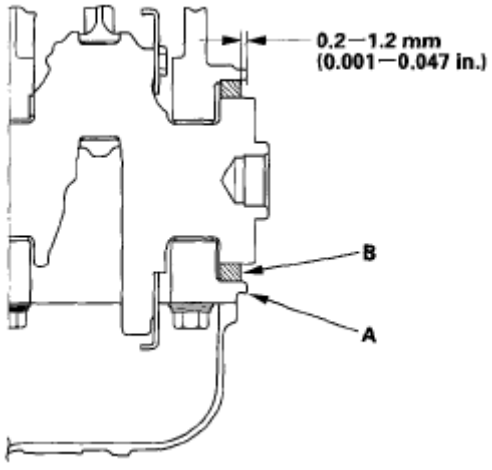


Fig. 65: Identifying Distance Between Engine Block And Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the baffle plate (A), then install the oil screen (B) with a new O-ring (C).

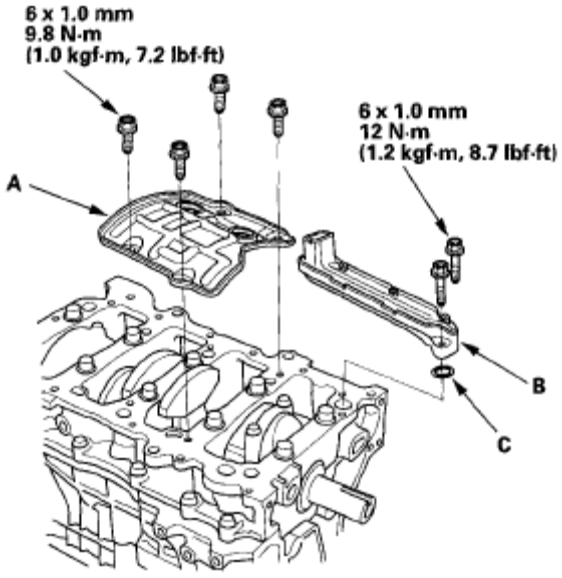


Fig. 66: Identifying Baffle Plate Oil Screen
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the oil pump (see **INSTALLATION**).
26. Install the oil pan (see **OIL PAN INSTALLATION**).
27. Install the cylinder head (see **CYLINDER HEAD INSTALLATION**).
28. M/T model: Install the flywheel, clutch disc and pressure plate (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (5-SPEED MODEL)**).
29. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
30. Install the transmission:
    - Manual transmission (see **TRANSMISSION INSTALLATION**)
    - Automatic transmission (see **TRANSMISSION INSTALLATION**)
31. Install the engine assembly (see **ENGINE INSTALLATION**).

NOTE: Whenever any crankshaft or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idle speed until it reaches normal operating temperature, then continue running it for about 15 minutes.

OIL PAN INSTALLATION

1. Remove all of the old liquid gasket from the oil pan mating surfaces, bolts, and bolt holes.
2. Clean, and dry the oil pan mating surfaces.
3. Apply liquid gasket, P/N 08717-00004, 08718-0001, 08718-0002, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the oil pan.

NOTE: Do not install components if too much time has passed after applying the liquid gasket (for P/N 08718-0002, no more than 4 minutes, for all others, no more than 5 minutes). Instead, remove the old residue and reapply the liquid gasket.

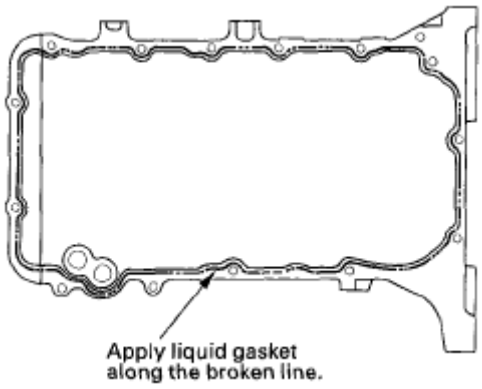


Fig. 67: Identifying Oil Pan Mating Surfaces
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the dowel pins (A), then install the oil pan (B) with new O-rings (C).

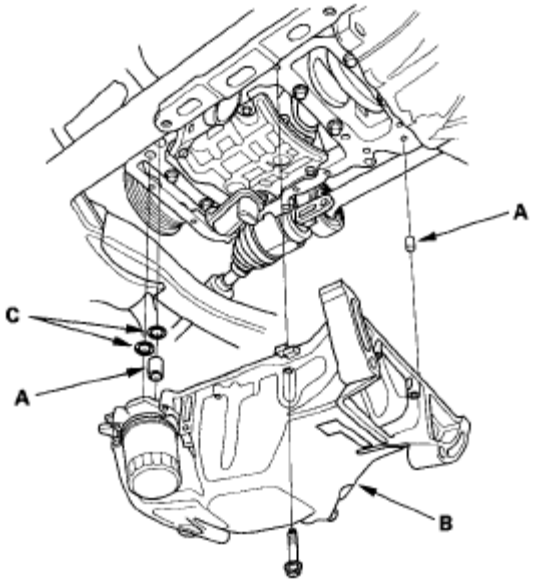


Fig. 68: Identifying Dowel Pins, Oil Pan And O-Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Tighten the bolts in two or three steps. In the final step, tighten all bolts, in sequence, to 18 N.m (1.8 kgf.m, 13 lbf.ft). Wipe off the excess liquid gasket on the each side of crankshaft pulley and flywheel/drive plate.

NOTE:

- **Wait at least 30 minutes to allow liquid gasket to cure before filling the engine with oil.**
- **Do not run the engine for at least 3 hours to allow liquid gasket to cure after installing the oil pan.**

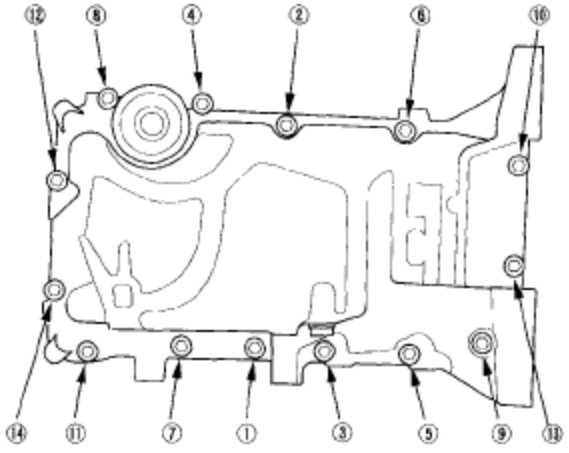


Fig. 69: Identifying Oil Pan Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the clutch cover/torque converter cover (A), and install the two bolts securing the transmission.

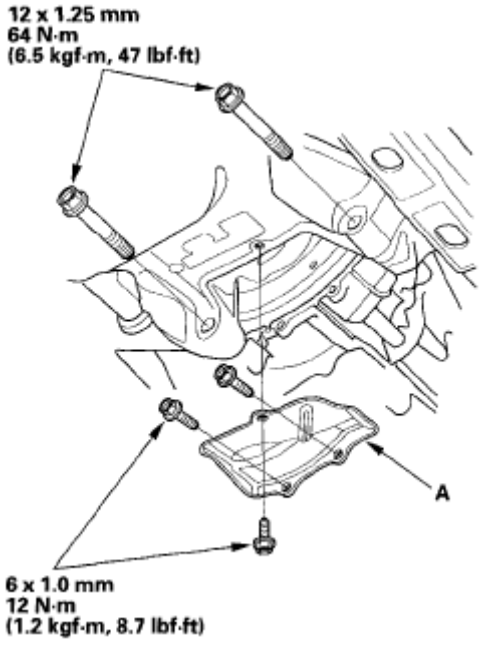


Fig. 70: Identifying Torque Converter Cover And Bolts (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. A/T model: Install the shift cable cover.

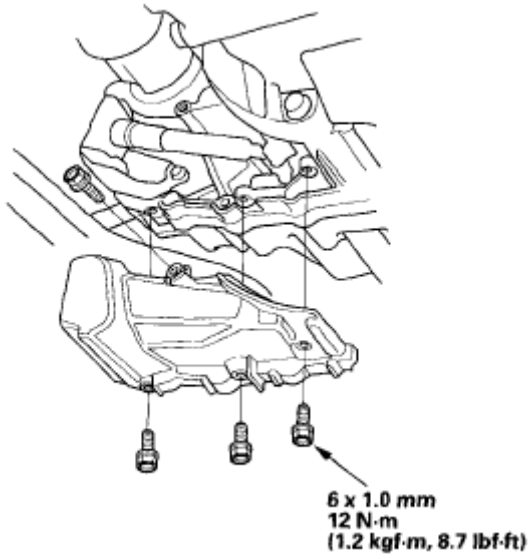


Fig. 71: Identifying Shift Cable Cover (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Install the A/C compressor bracket.

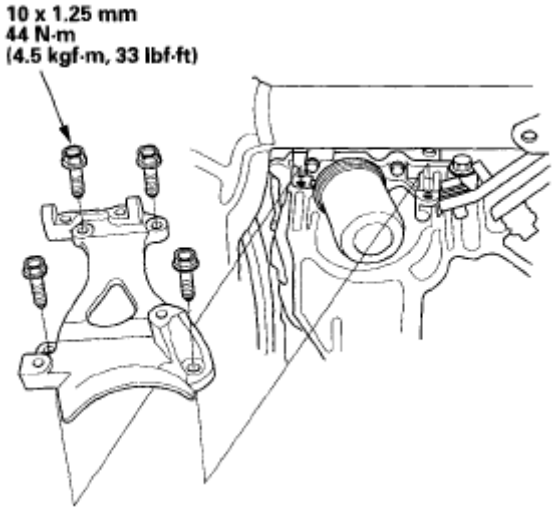


Fig. 72: Identifying A/C Compressor Bracket (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the lower torque rod bracket. M/T

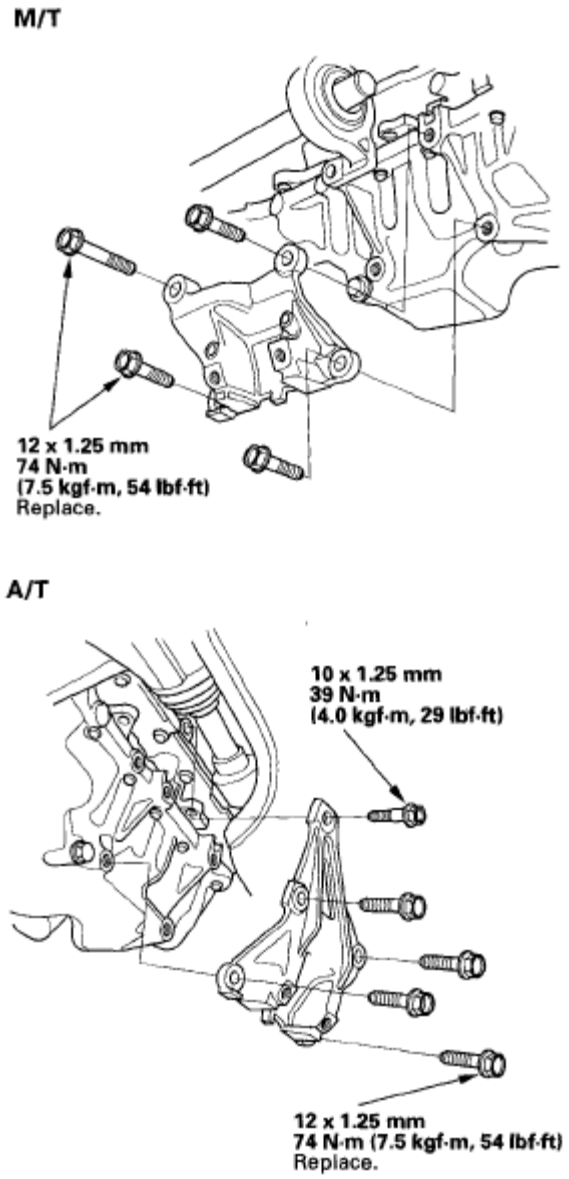


Fig. 73: Identifying Lower Torque Rod Bracket (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. If the engine is still in the vehicle, do the following steps.
11. Lower the vehicle on the lift.
12. Loosen the upper torque rod mounting bolt (see step 6 on **ENGINE INSTALLATION**).
13. Raise the vehicle on the lift to full height.

14. Install the lower torque rod (see step 16 on **ENGINE INSTALLATION**).
15. Lower the vehicle on the lift.
16. Tighten the upper torque rod mounting bolt (see step 18 on **ENGINE INSTALLATION**).
17. Raise the vehicle on the lift to full height.
18. Install exhaust pipe A (see step 30 on **ENGINE INSTALLATION**).
19. Lower the vehicle on the lift.
20. Install the A/C compressor. Install the harness clamp, then connect the A/C compressor clutch connector (see step 34 on **ENGINE INSTALLATION**).
21. Install the A/C condenser fan shroud (see step 5 on **A/C CONDENSER REPLACEMENT**).
22. Install the drive belt (see **DRIVE BELT INSPECTION**).
23. Refill the engine with engine oil (see step 4 on **ENGINE OIL REPLACEMENT**).
24. Install the splash shield (see step 31 on **ENGINE INSTALLATION**).

PULLEY END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

Oil seal driver 07LAD-PT3010A

1. Remove the crankshaft pulley (see **CRANKSHAFT PULLEY REMOVAL AND INSTALLATION**).
2. Remove the pulley end crankshaft oil seal.
3. Clean, and dry the crankshaft oil seal housing.
4. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
5. Using the seal driver, drive in the crankshaft oil seal until the driver bottoms against the oil pump. When the seal is in place, clean any excess grease off the crankshaft, and check that the oil seal lip is not distorted.

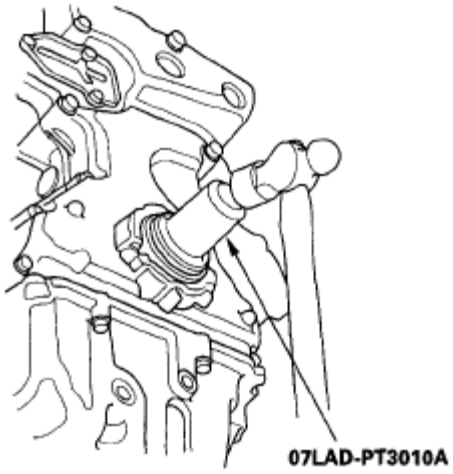


Fig. 74: Identifying Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the crankshaft pulley (see **INSTALLATION**).

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Driver 07749-0010000
- Oil seal driver attachment 96 07ZAD-PNAA100

1. Remove the transmission:
   - Manual transmission (see **TRANSMISSION REMOVAL**)
   - Automatic transmission (see **TRANSMISSION REMOVAL**)
2. M/T model: Remove the pressure plate, clutch disc and flywheel (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (5-SPEED MODEL)**).
3. A/T model: Remove the drive plate (see **DRIVE PLATE REMOVAL AND INSTALLATION**).
4. Remove the transmission end crankshaft oil seal.
5. Clean, and dry the crankshaft oil seal housing.
6. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.

7. Use the special tools to drive a new oil seal squarely into the engine block to the specified installed height.

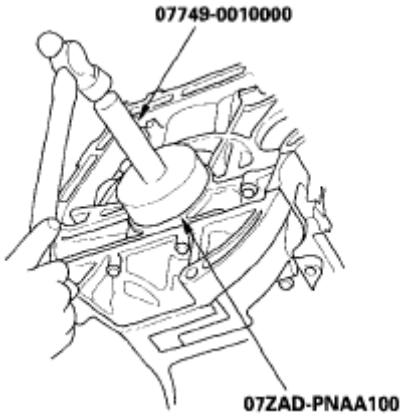


Fig. 75: Identifying Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Measure the distance between the engine block (A) and oil seal (B).

   Oil Seal Installed Height: 0.2-1.2 mm (0.001-0.047 in.)

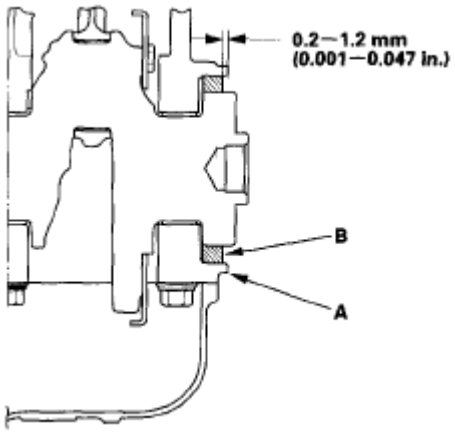


Fig. 76: Identifying Distance Between Engine Block And Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. M/T model: Install the flywheel , clutch disc and pressure plate (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (5-SPEED MODEL)**).
10. A/T model: Install the drive plate (see **DRIVE PLATE REMOVAL AND**

INSTALLATION).

11. Install the transmission:
    - Manual transmission (see **TRANSMISSION INSTALLATION**)
    - Automatic transmission (see **TRANSMISSION INSTALLATION**)

DRAIN BOLT/SEALING BOLT INSTALLATION

NOTE: When installing the drain bolt and/or sealing bolt, always use a new washer.

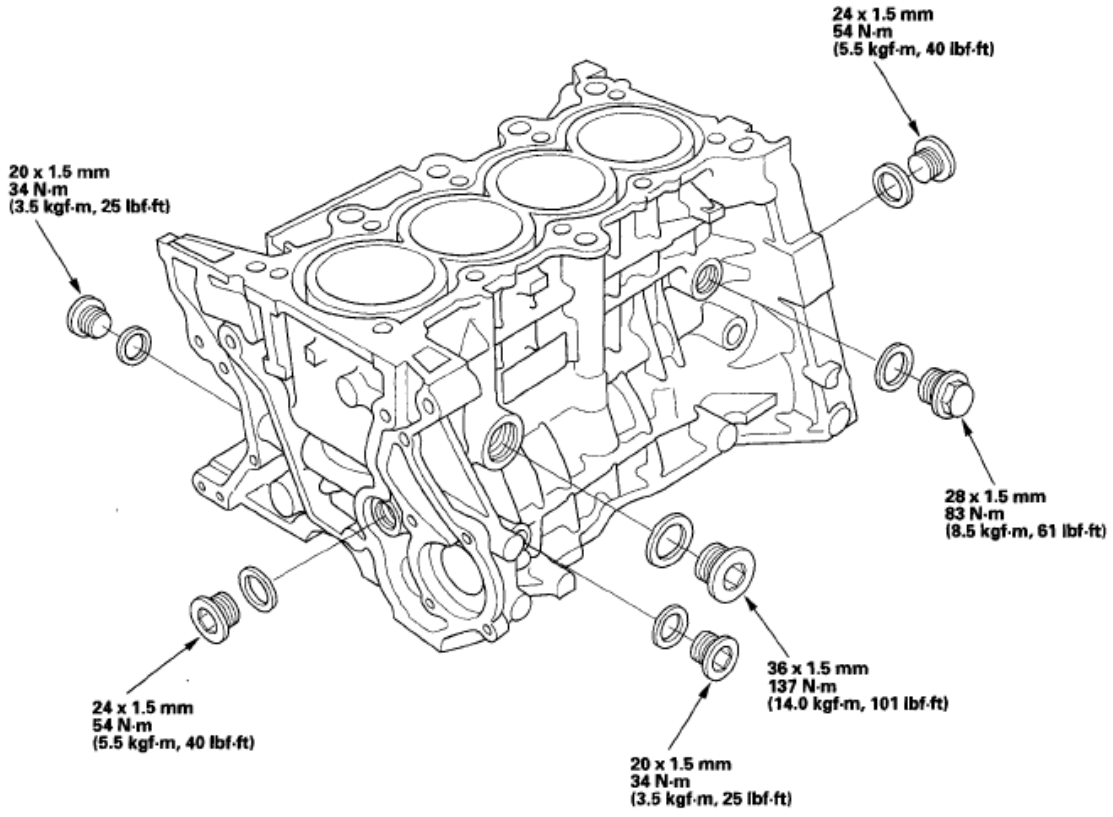


Fig. 77: Identifying Drain Bolt/Sealing Bolt (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

ENGINE BLOCK (K20Z3)

SPECIAL TOOLS

Ref. No.	Tool Number	Description	Qty
①	07ZAD-PNAA100	Oil Seal Driver Attachment 96	1
②	07746-0010700	Attachment, 24 x 26 mm	1
③	07749-0010000	Driver	1

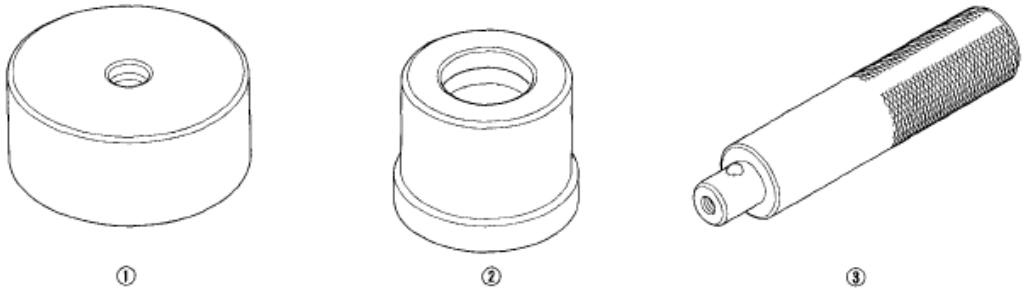


Fig. 78: Identifying Special Tools
Courtesy of AMERICAN HONDA MOTOR CO., INC.

COMPONENT LOCATION INDEX

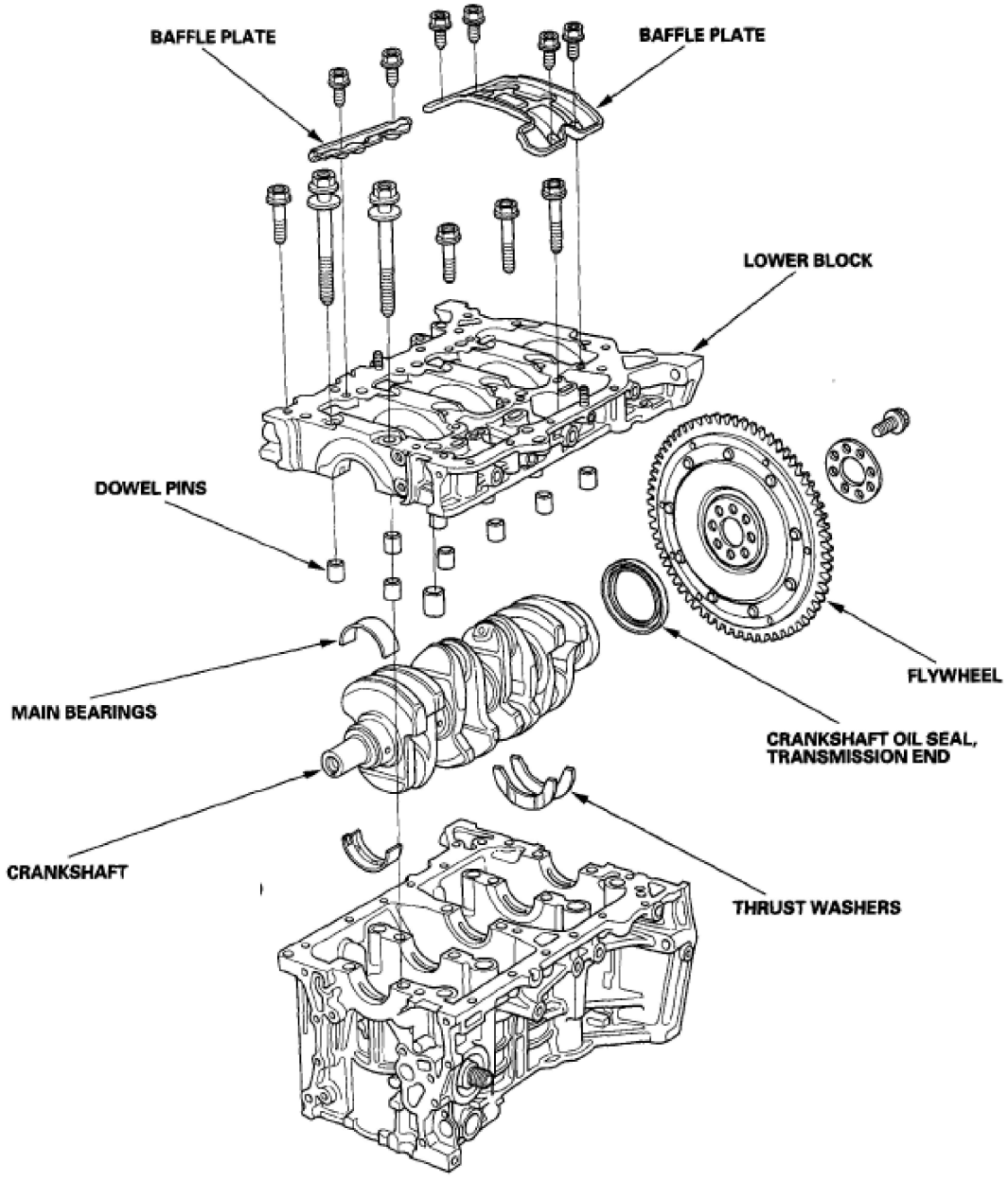


Fig. 79: Identifying Flywheel, Lower Block And Crankshaft
Courtesy of AMERICAN HONDA MOTOR CO., INC.

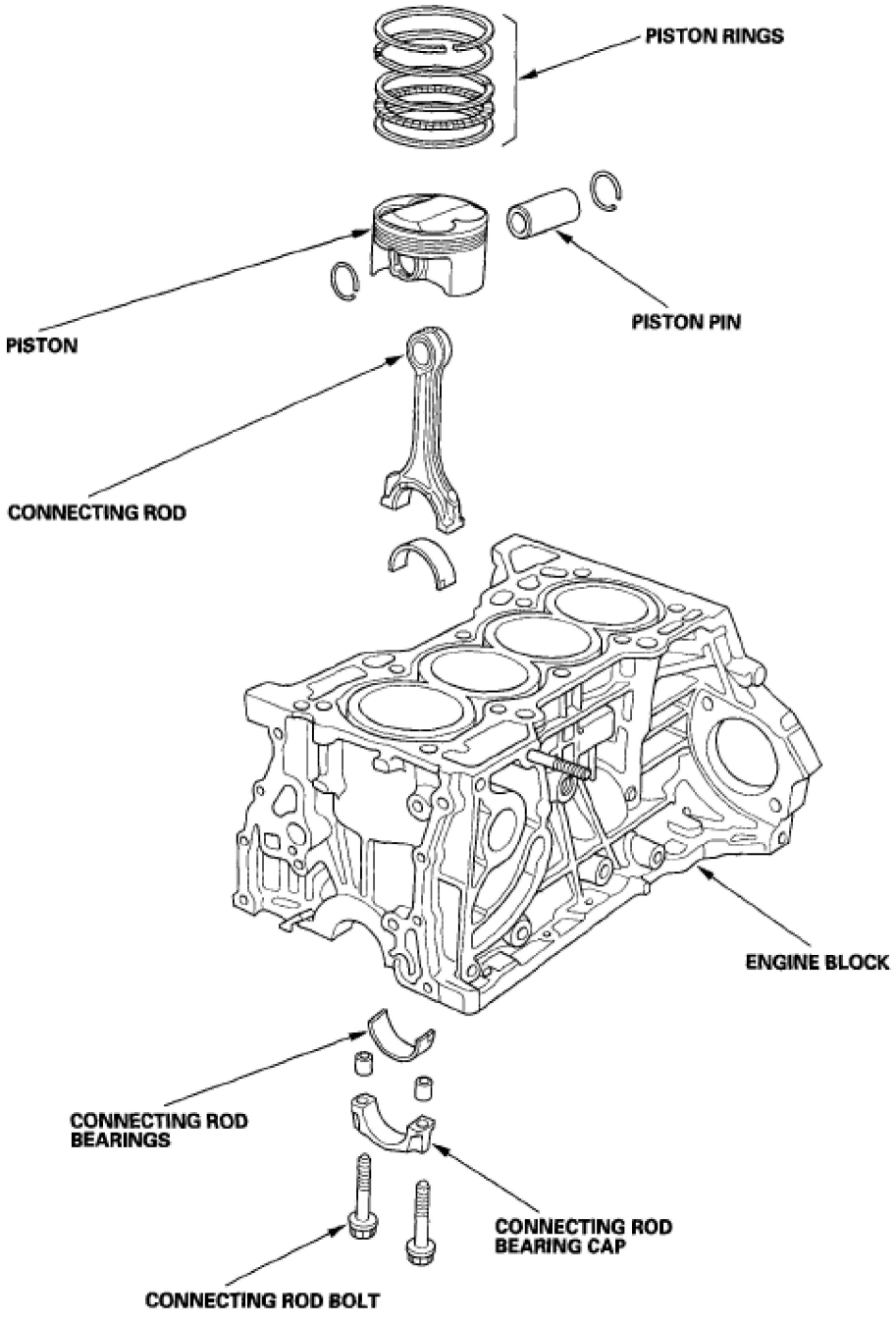


Fig. 80: Identifying Engine Block, Piston And Connecting Rod
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD AND CRANKSHAFT END PLAY INSPECTION

1. Remove the oil pump (see **OIL PUMP REMOVAL**).
2. Remove the baffle plates (see step 7).

3. Measure the connecting rod end play with a feeler gauge between the connecting rod and crankshaft.

   Connecting Rod End Play

   Standard (New): 0.15-0.30 mm (0.006-0.012 in.)

   Service Limit: 0.40 mm (0.016 in.)

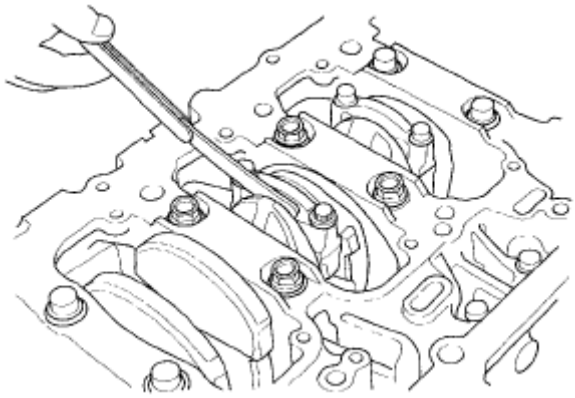


Fig. 81: Measuring Connecting Rod End Play
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. If the connecting rod end play is beyond service limit, install a new connecting rod, and recheck. If it is still beyond service limit; replace the crankshaft (see **CRANKSHAFT AND PISTON REMOVAL**).
5. Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; the dial reading should not exceed the service limit.

   Crankshaft End Play

   Standard (New): 0.10-0.35 mm (0.004-0.014 in.)

   Service Limit: 0.45 mm (0.018 in.)

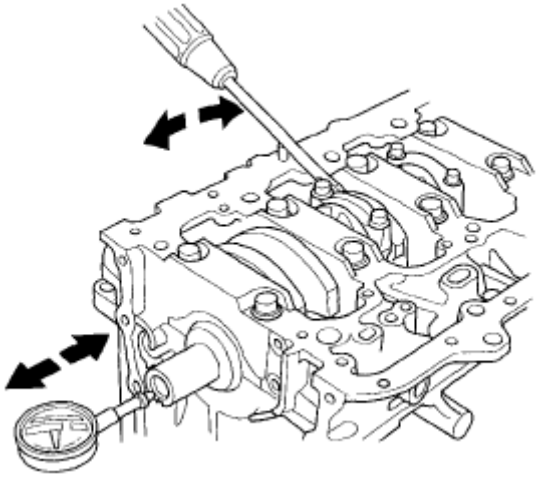


Fig. 82: Identifying Crankshaft Firmly Away From Dial Indicator
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the end play is beyond service limit, replace the thrust washers and recheck, if it is still beyond service limit, replace the crankshaft (see **CRANKSHAFT AND PISTON REMOVAL**).

CRANKSHAFT MAIN BEARING REPLACEMENT

Main Bearing Clearance Inspection

1. To check main bearing-to-journal oil clearance, remove the lower block and bearing halves (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.
4. Reinstall the bearings and lower block, then torque the bolts to 29 N.m (3.0 kgf.m, 22 lbf.ft) + 56 ° in the proper sequence (see step 19).

NOTE: Do not rotate the crankshaft during inspection.

5. Remove the lower block and bearings again, and measure the widest part of the plastigage.

Main Bearing-to-Journal Oil Clearance

No. 1, 2, 4, 5 Journals:

Standard (New): 0.017 - 0.041 mm (0.0007 - 0.0016 in.)

Service Limit: 0.050 mm (0.0020 in.) No. 3 Journal:

Standard (New): 0.025 - 0.049 mm (0.0010 - 0.0019 in.)

Service Limit: 0.055 mm (0.0022 in.)

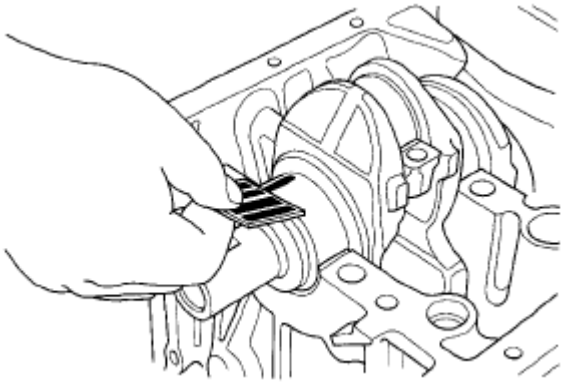


Fig. 83: Identifying Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. If the plastigage measures too wide or too narrow, remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code(s), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below the current one), and check again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

Main Bearing Selection

Crankshaft Bore Code Location

1. Numbers, letters or bars have been stamped on the end of the block as a code for the size of each of the five main journal bores. Write down the crank bore codes.

   If you can't read the codes because of accumulated dirt and dust, do not scrub

them with a wire brush or scraper. Clean them only with solvent or detergent.

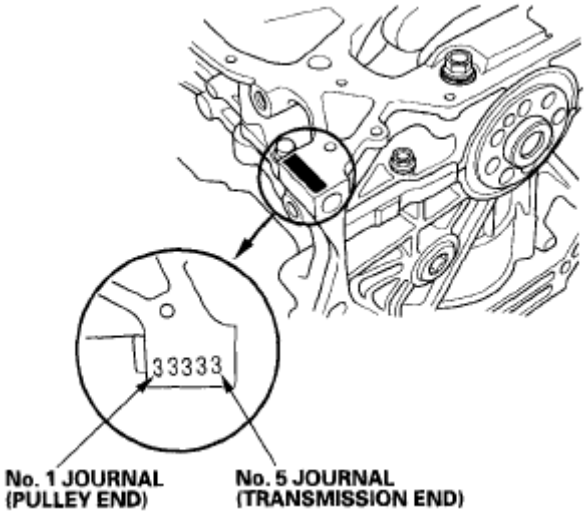


Fig. 84: Identifying Crankshaft Bore Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Main Journal Code Location

2. The main journal codes are stamped on the crankshaft in either location.

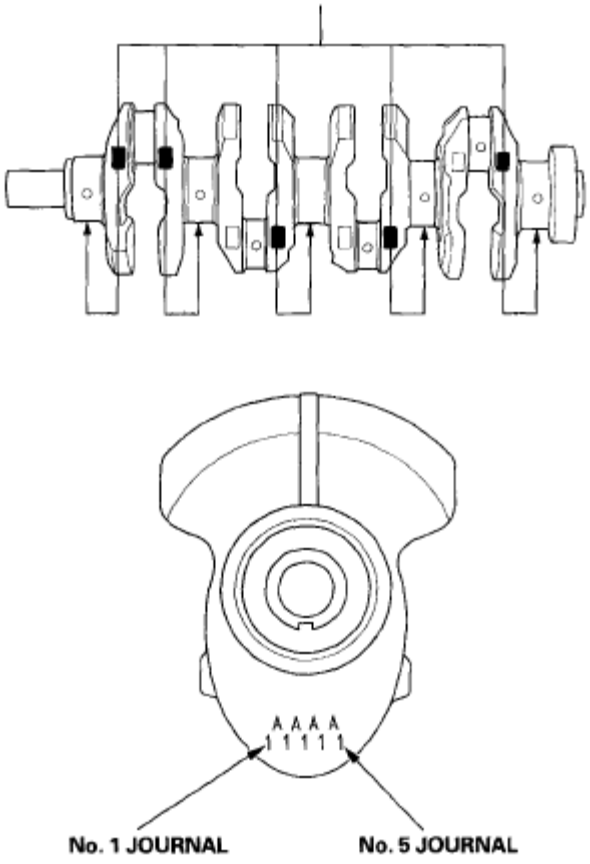


Fig. 85: Identifying Main Journal Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Use the crank bore codes and crank journal codes to select the appropriate replacement bearings from the following table.

NOTE:

- **The color code is on the edge of the bearing.**
- **When using bearing halves of different colors, it does not matter which color is used in the top or bottom.**

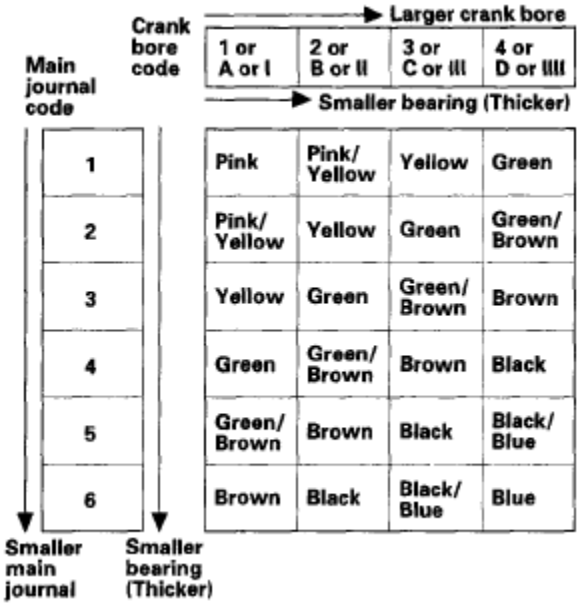


Fig. 86: Identifying Crank Bore Codes And Crank Journal Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CONNECTING ROD BEARING REPLACEMENT

Rod Bearing Clearance Inspection

1. Remove the oil pump (see **OIL PUMP REMOVAL**).
2. Remove the baffle plates (see step 7).
3. Remove the connecting rod cap and bearing half.
4. Clean the crankshaft rod journal and bearing half with a clean shop towel.
5. Place plastigage across the rod journal.
6. Reinstall the bearing half and cap, and torque the bolts to 29 N.m (3.0 kgf.m, 22 lbf.ft) + 90 °

NOTE: Do not rotate the crankshaft during inspection.

7. Remove the rod cap and bearing half, and measure the widest part of the plastigage.

Connecting Rod Bearing-to-Journal Oil Clearance

Standard (New): 0.032-0.066 mm (0.0013-0.0026 in.)

Service Limit: 0.077 mm (0.0030 in.)

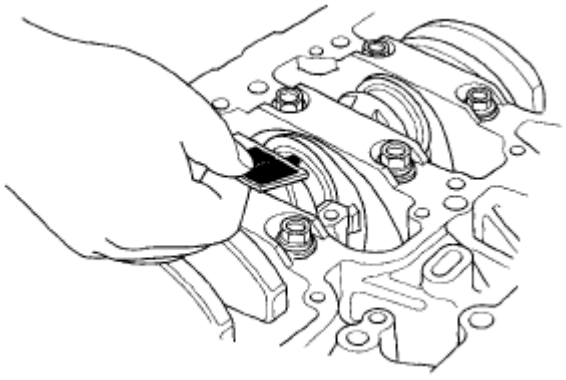


Fig. 87: Identifying Widest Part Of Plastigage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code(s), and recheck the clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.
9. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below the current one), and check clearance again. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearing, replace the crankshaft and start over.

Rod Bearing Selection

1. Inspect each connecting rod for cracks and heat damage.

Connecting Rod Big End Bore Code Locations

2. Each rod has a tolerance range from 0 to 0.024 mm (0.0009 in.), in 0.006 mm (0.0002 in.) increments, depending on the size of its big end bore. It's then stamped with a number or bar (1,2,3, or 4/I, II, III, or Mil) indicating the range. You may find any combination of numbers and bars in any engine. (Half the number or bar is stamped on the bearing cap, the other half is on the rod.)

   If you can't read the code because of an accumulation of oil and varnish, do not

scrub it with a wire brush or scraper. Clean it only with solvent or detergent.

Normal Bore Size: 51.0 mm (2.01 in.)

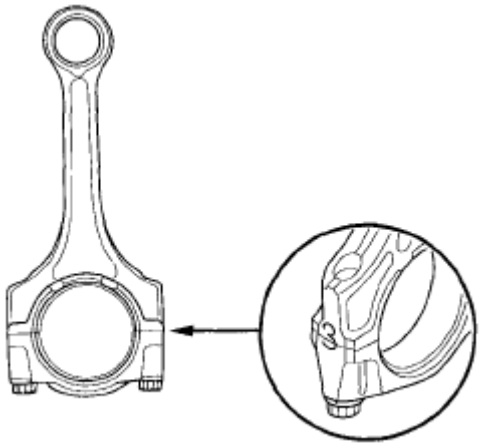


Fig. 88: Identifying Connecting Rod Big End Bore Code Locations
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Connecting Rod Journal Code Location

3. The connecting rod journal codes are stamped on the crankshaft in either location.

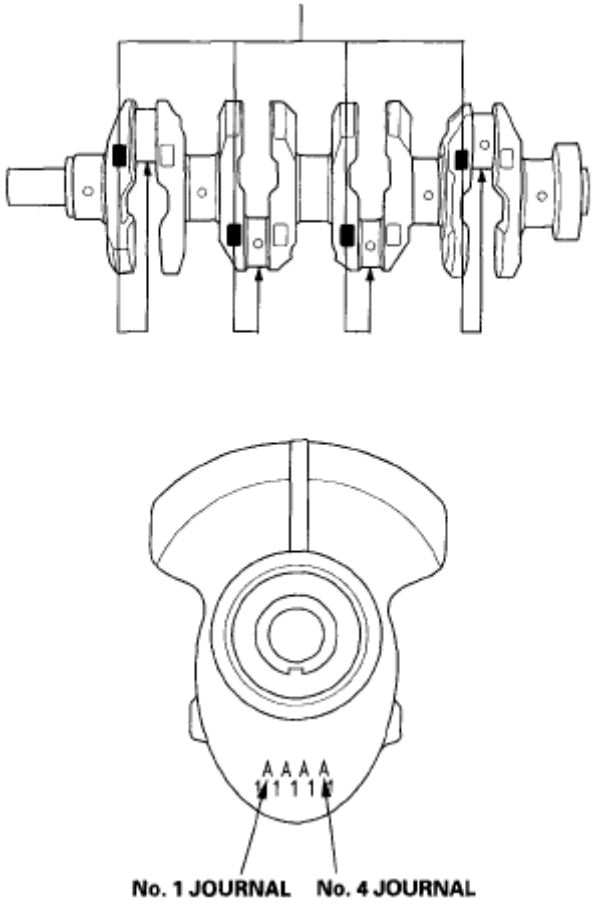


Fig. 89: Identifying Connecting Rod Journal Code Location
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Use the big end bore codes and rod journal codes to select appropriate replacement bearings from the following table.

NOTE:

- **The color code is on the edge of the bearing.**
- **When using bearing halves of different colors, it does not matter which color is used in the top or bottom.**

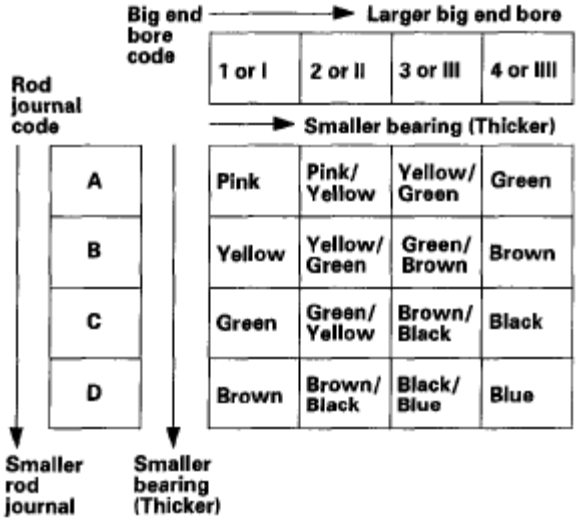


Fig. 90: Identifying Big End Bore Codes And Rod Journal Codes
Courtesy of AMERICAN HONDA MOTOR CO., INC.

OIL PAN REMOVAL

1. If the engine is out of the vehicle, go to step 16.
2. Raise the vehicle on the lift to full height.
3. Drain the engine oil (see **OIL PRESSURE TEST**).
4. Remove the front wheels.
5. Remove the splash shield (see step 24 on **ENGINE REMOVAL**).
6. Separate the stabilizer links (see **STABILIZER LINK REMOVAL/INSTALLATION**).
7. Separate the knuckles from the lower arms (see step 5 on **LOWER ARM REMOVAL/INSTALLATION**).
8. Remove the steering gearbox bracket. Remove the steering gearbox mounting bolt, stiffener mounting bolt, and stiffener (see step 34 on **ENGINE REMOVAL**).
9. Remove the steering gearbox mounting bolt, stiffener mounting bolt, and stiffener. Remove the harness clamp from the front subframe (see step 36 on **ENGINE REMOVAL**).
10. Remove the lower torque rod (see step 46 on **ENGINE REMOVAL**).

11. Remove the front mount mounting bolt (see step 47 on **ENGINE REMOVAL**).
12. Note the reference marks on both sides of the front subframe that line up with the body (see step 48 on **ENGINE REMOVAL**).
13. Loosen the front subframe body mount bracket mounting bolts on both side (see step 49 on **ENGINE REMOVAL**).
14. Support the front subframe with the front subframe adapter and a jack (see step 50 on **ENGINE REMOVAL**).
15. Remove the front subframe (see step 52 on **ENGINE REMOVAL**).
16. Remove the lower torque rod bracket.

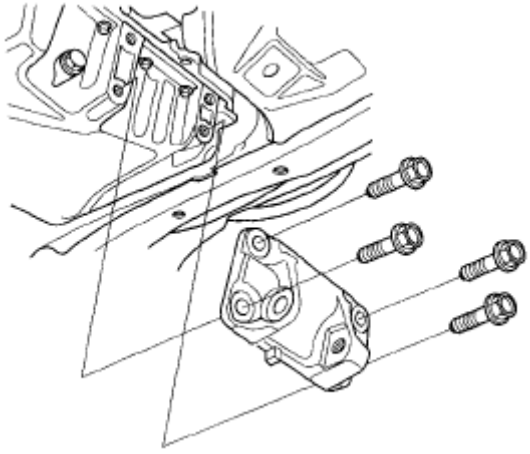


Fig. 91: Identifying Lower Torque Rod Bracket
Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Remove the clutch cover (A) and transmission mounting bolts (B).

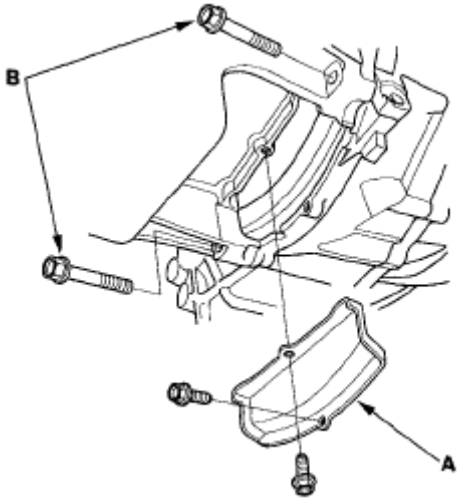


Fig. 92: Identifying Clutch Cover And Transmission Mounting Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

18. Remove the bolts securing the oil pan.
19. Using a flat blade screwdriver, separate the oil pan from the block in the places shown.

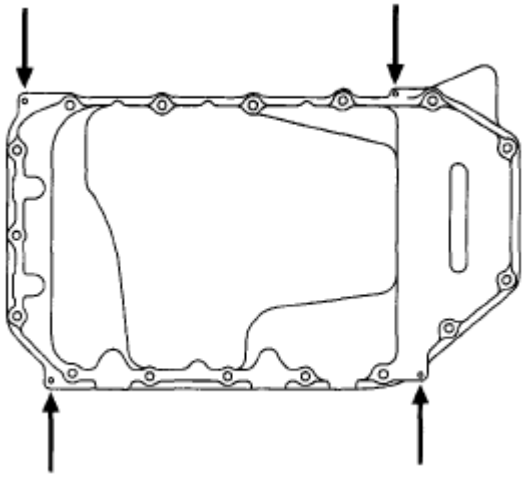


Fig. 93: Identifying Oil Pan From Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Remove the oil pan.

CRANKSHAFT AND PISTON REMOVAL

1. Remove the engine assembly (see **ENGINE REMOVAL**).
2. Remove the transmission (see **TRANSMISSION REMOVAL**).
3. Remove the pressure plate , clutch disc and flywheel (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (5-SPEED MODEL)**).
4. Remove the oil pan (see **OIL PAN REMOVAL**).
5. Remove the oil pump (see **OIL PUMP REMOVAL**).
6. Remove the cylinder head (see **CYLINDER HEAD REMOVAL**).
7. Remove the baffle plates.

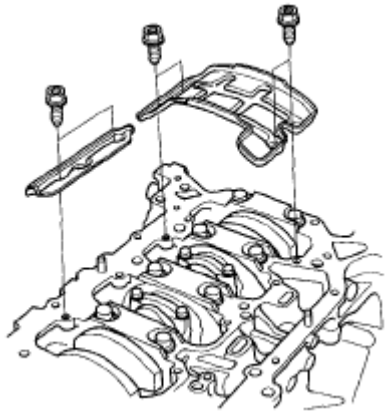


Fig. 94: Identifying Baffle Plates
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Remove the 8 mm bolts in sequence.

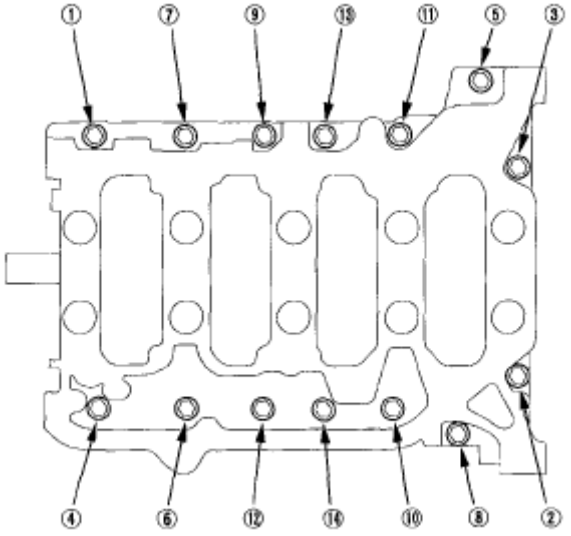


Fig. 95: Identifying Bolts In Sequence Position
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. Remove the bearing cap bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

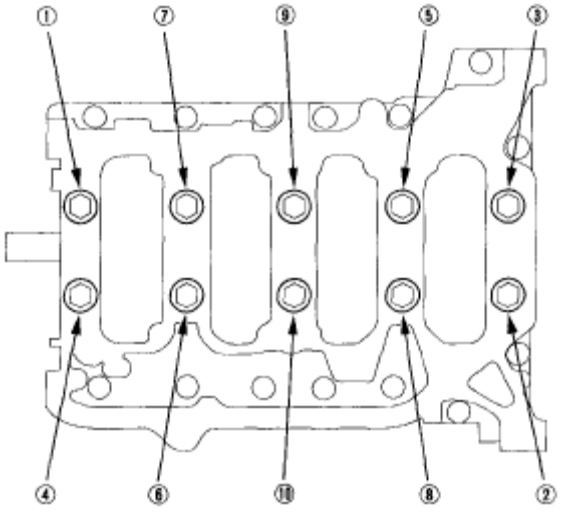


Fig. 96: Identifying Bearing Cap Bolts
Courtesy of AMERICAN HONDA MOTOR CO., INC.

10. Remove the lower block and bearings. Keep all the bearings in order.

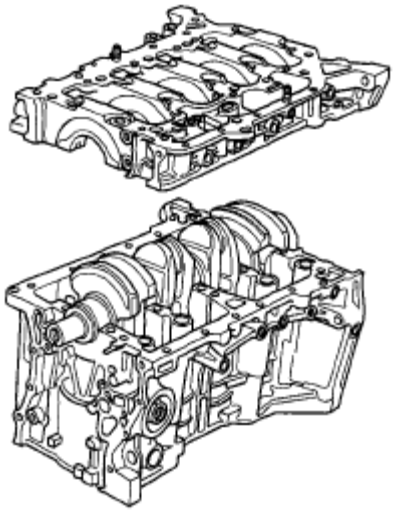


Fig. 97: Identifying Lower Block And Bearings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

11. Remove the rod caps/bearings. Keep all caps/bearings in order.
12. Lift the crankshaft out of the engine. Being careful not to damage the journals.

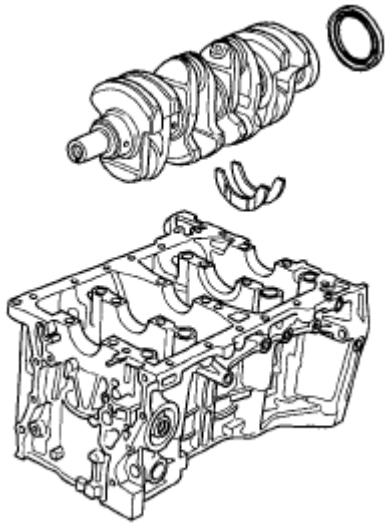


Fig. 98: Identifying Crankshaft Out Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

13. Remove the upper bearing halves from the connecting rods, and set them aside with their respective caps.
14. If you can feel a ridge of metal or hard carbon around the top of each cylinder,

remove it with a ridge reamer (A). Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the pistons as they are pushed out.

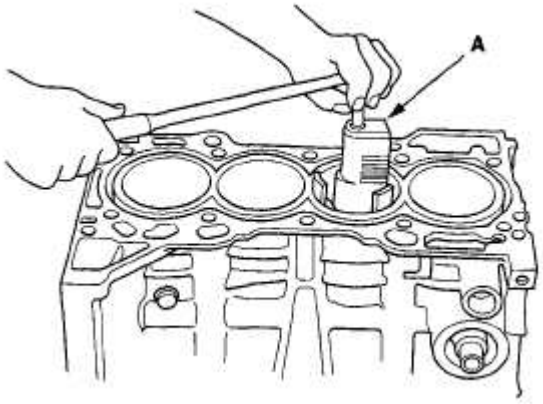


Fig. 99: Identifying Hard Carbon Around Top Of Each Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

15. Use the wooden handle of a hammer (A) to drive out the piston/connecting rod assembly (B).

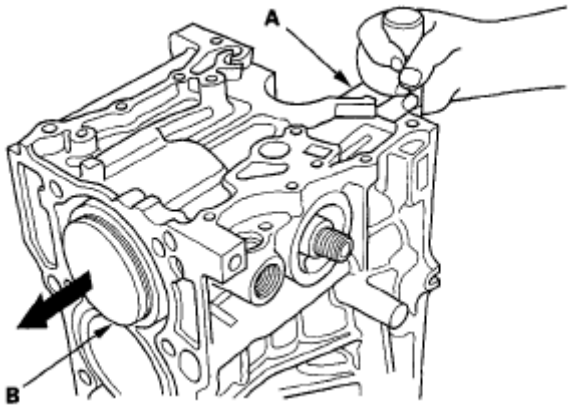


Fig. 100: Driving Out Piston/Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

16. Reinstall the lower block and bearings on the engine in the proper order.
17. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.
18. Mark each piston/connecting rod assembly with its cylinder number to make

sure they are reused in the original order.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

CRANKSHAFT INSPECTION

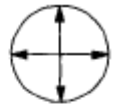
Out-of-Round and Taper

1. Remove the crankshaft from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
3. Clean the keyway and threads.
4. Measure the out-of-round at the middle of each rod and main journal in two places. The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round

Standard (New): 0.005 mm (0.0002 in.) max.

Service Limit: 0.010 mm (0.0004 in.)



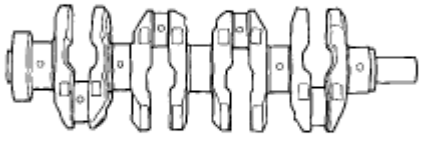


Fig. 101: Identifying Crankshaft Journal Out-Of-Round
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the taper at the edges of each rod and main journal. The difference between measurements on each journal must not be more than the service limit.

   Journal Taper

   Standard (New): 0.005 mm (0.0002 in.) max.

   Service Limit: 0.010 mm (0.0004 in.)

   Straightness

6. Place the engine block on the surface plate.
7. Clean and install the bearings on the No. 1 and No. 5 journals of the engine block.
8. Lower the crankshaft into the engine block.
9. Measure runout on all main journals. Rotate the crankshaft two complete revolutions. The difference between measurements on each journal must not be more than the service limit.

   Crankshaft Total Runout

   Standard (New): 0.03 mm (0.0012 in.) max.

   Service Limit: 0.04 mm (0.0016 in.)

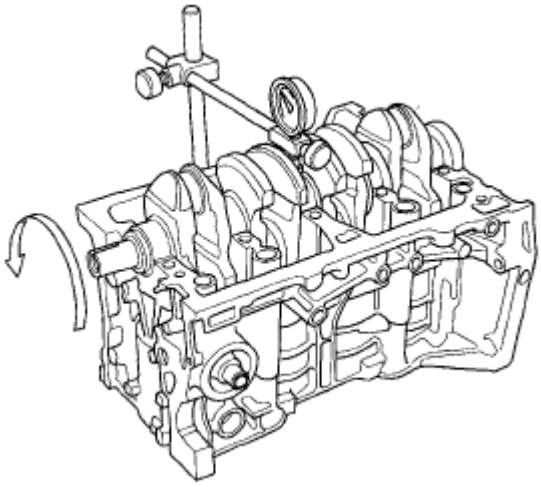


Fig. 102: Measuring Runout On Main Journals
Courtesy of AMERICAN HONDA MOTOR CO., INC.

BLOCK AND PISTON INSPECTION

1. Remove the crankshaft and pistons (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Check the piston for distortion or cracks.
3. Measure the piston diameter at a point 11 mm (0.4 in.) from the bottom of the skirt. There are two standard-size pistons (No Letter or A, and B). The letter is stamped on the top of the piston. Letters are also stamped on the block as cylinder bore sizes.

   Piston Diameter

   Standard (New):

   No Letter (or A): B: 85.980-85.990 mm (3.3850-3.3854 in.)

   B: 85.970-85.980 mm (3.3846-3.3850 in.)

   Service Limit:

   No Letter (or A): 85.930 mm (3.3831 in.) 85.920 mm (3.3827 in.)

   Oversize Piston Diameter

0.25: 86.230-86.240 mm (3.3949-3.3953 in.)

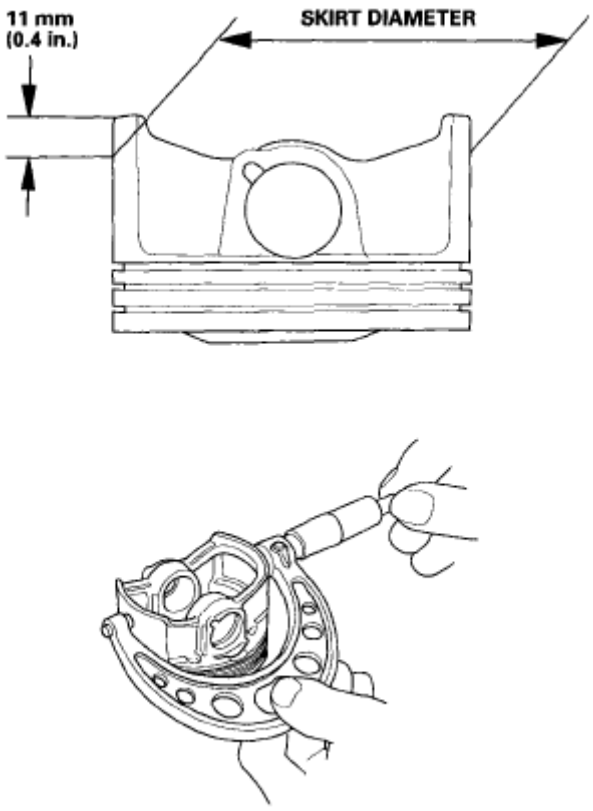


Fig. 103: Measuring Piston Diameter Point From Bottom Of Skirt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the wear and taper in direction X and Y at three levels in each cylinder as shown. If the measurements in any cylinder are beyond the Oversize Bore Service Limit, replace the engine block. If the engine block is being rebored, refer to step 7 after reboring.

   Cylinder Bore Size

   Standard (New):

   A or I: 86.010-86.020 mm (3.3862-3.3866 in.)

   B or II: 86.000-86.010 mm (3.3858-3.3862 in.)

   Service Limit: 86.070 mm (3.3886 in.

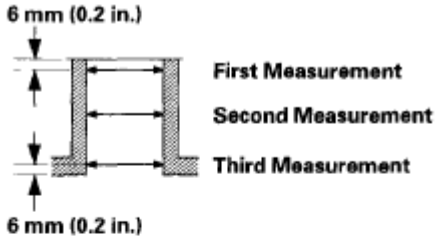
Oversize

0.25: 86.250-86.260 mm (3.3957-3.3961 in.)

Reboring Limit: 0.25 mm (0.01 in.) max.

Bore Taper

Limit: (Difference between first and third measurement) 0.05 mm (0.002 in.)



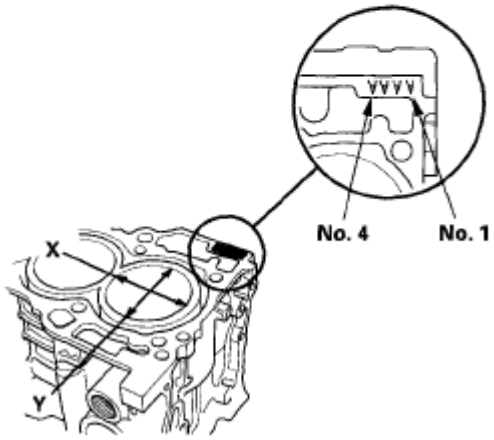


Fig. 104: Identifying Wear And Taper Direction X And Y Three Levels In Each Cylinder
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Scored or scratched cylinder bores must be honed.
6. Check the top of the engine block for warpage. Measure along the edges, and across the center as shown.

Engine Block Warpage

Standard (New): 0.07 mm (0.003 in.) max.

Service Limit: 0.10 mm (0.004 in.)

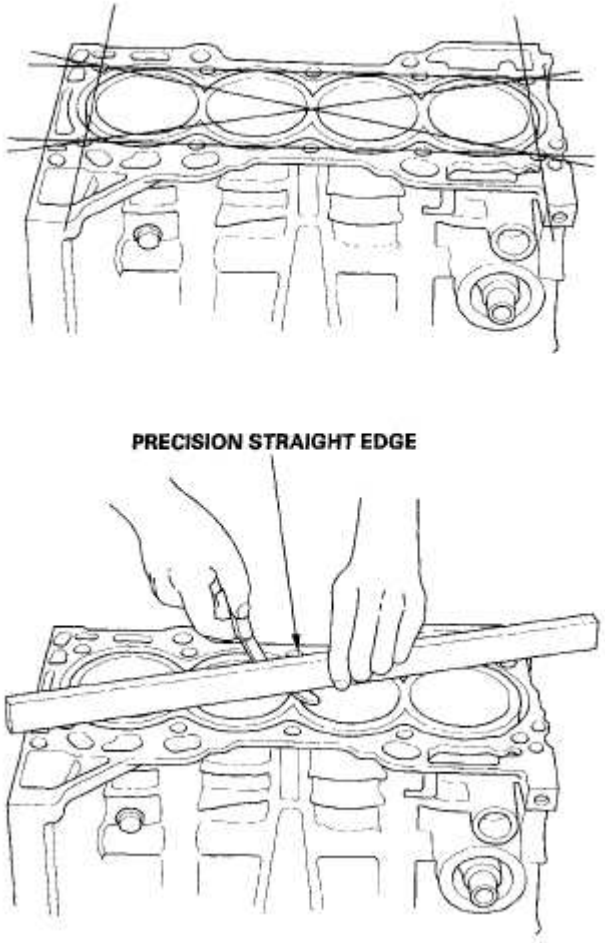


Fig. 105: Identifying Top Of Engine Block For Warpage
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Calculate the difference between the cylinder bore diameter and the piston diameter. If the clearance is near or exceeds the service limit, inspect the piston and cylinder bore for excessive wear.

Piston-to-Cylinder Bore Clearance

Standard (New): 0.020-0.040 mm (0.0008-0.0016 in.)

Service Limit: 0.05 mm (0.002 in.)

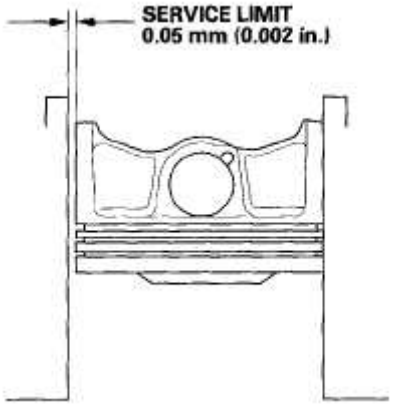


Fig. 106: Identifying Difference Between Cylinder Bore Diameter And Piston Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

CYLINDER BORE HONING

Only a scored or scratched cylinder bore must be honed.

1. Measure the cylinder bores (see **BLOCK AND PISTON INSPECTION**). If the engine block is to be reused, hone the cylinders, and remeasure the bores.
2. Hone the cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern (A). Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent. Do not use stones that are worn or broken.

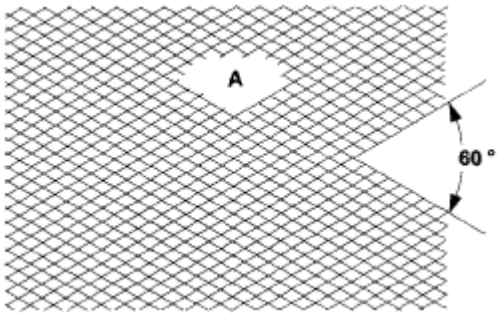


Fig. 107: Identifying Cross-Hatch Pattern
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil them

immediately to prevent rusting. Never use solvent, it will only redistribute the grit on the cylinder walls.

4. If scoring or scratches are still present in the cylinder bores after honing the engine block to the service limit, rebore the engine block. Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail, and does not run the full length of the bore.

PISTON, PIN, AND CONNECTING ROD REPLACEMENT

Disassembly

1. Remove the piston from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Apply new engine oil to the piston pin snap rings (A), and turn them in the ring grooves until the end gaps are lined up with the cutouts in the piston pin bores (B).

NOTE: Take care not to damage the ring grooves.

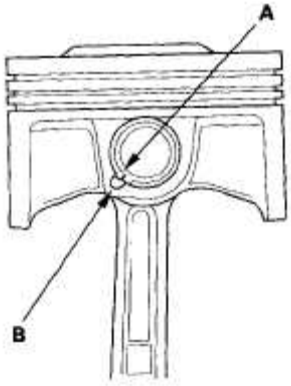


Fig. 108: Identifying Piston Pin Snap Rings And Piston Pin Bores
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Remove both snap rings (A). Start at the cutout in the piston pin bore. Remove the snap rings carefully so they do not go flying or get lost. Wear eye protection.

Fig. 109: Identifying Snap Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Heat the piston and connecting rod assembly to about 158°F (70°C), then remove the piston pin.

Fig. 110: Heating Piston And Connecting Rod Assembly
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Inspection

NOTE: Inspect the piston, piston pin, and connecting rod when they are at room temperature.

1. Measure the diameter of the piston pin.

   Piston Pin Diameter

   Standard (New): 21.961-21.965 mm (0.8646-0.8648 in.)

Service Limit: 21.953 mm (0.8643 in.)

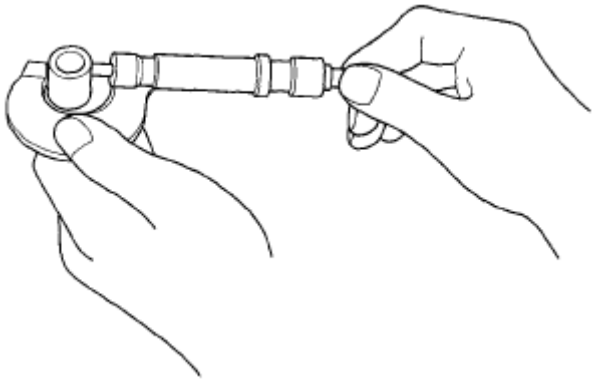


Fig. 111: Measuring Diameter Of Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Zero the dial indicator to the piston pin diameter.

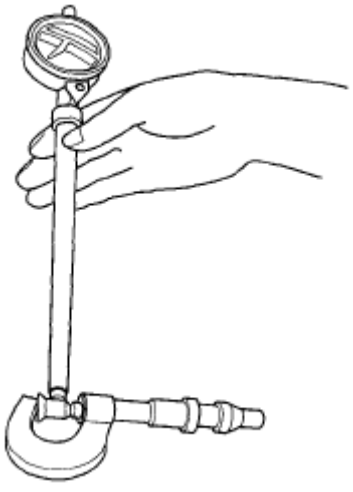


Fig. 112: Seating Dial Indicator To Piston Pin Diameter
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Check the difference between the piston pin diameter and piston pin hole diameter in the piston.

Piston Pin-to-Piston Clearance

Standard (New): -0.005 to +0.002 mm (-0.00020 to +0.00008 in.)

Service Limit: 0.005 mm (0.0002 in.)

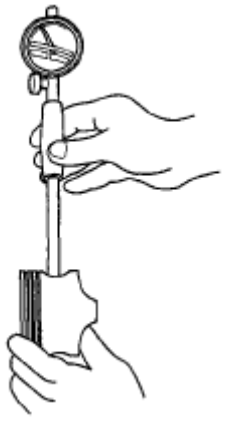


Fig. 113: Checking Difference Between Piston Pin Diameter And Piston Pin Hole Diameter In Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Measure the piston pin-to-connecting rod clearance.

Piston Pin-to-Connecting Rod Clearance

Standard (New): 0.005-0.015 mm (0.0002-0.0006 in.)

Service Limit: 0.02 mm (0.0008 in.)

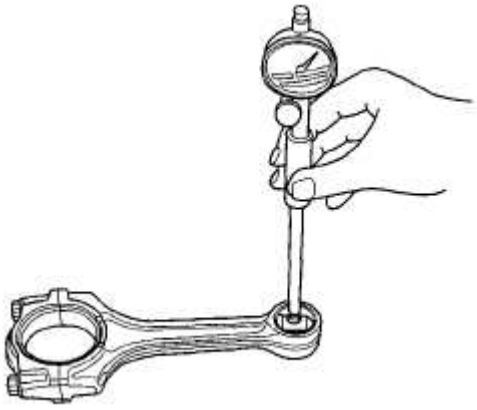


Fig. 114: Measuring Piston Pin-To-Connecting Rod Clearance
Courtesy of AMERICAN HONDA MOTOR CO., INC.

Reassembly

1. Install a piston pin snap ring (A).

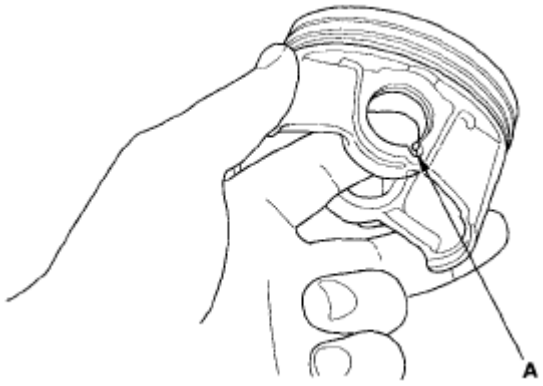


Fig. 115: Identifying Piston Pin Snap Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Coat the piston pin bore in the piston, the bore in the connecting rod, and the piston pin with new engine oil.
3. Heat the piston to about 158°F (70°C).

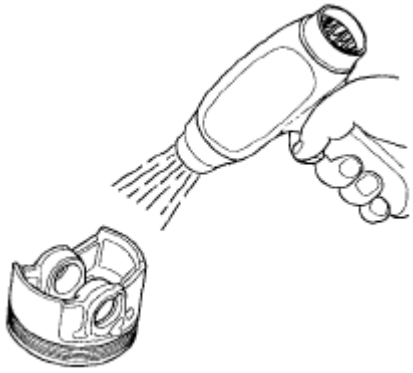


Fig. 116: Heating Piston
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Assemble the piston (A) and connecting rod (B) with the arrow (C) and the embossed mark (D) on the same side. Install the piston pin (E).

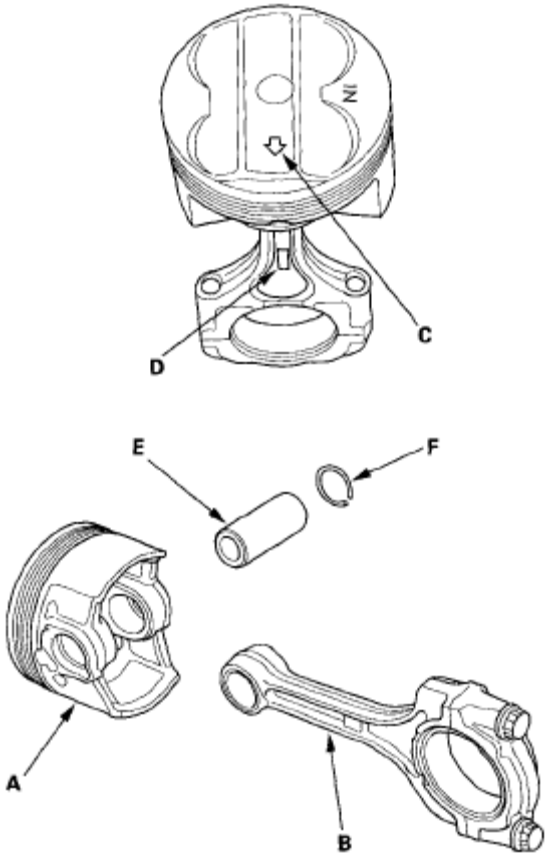


Fig. 117: Identifying Piston , Connecting Rod And Piston Pin
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Install the remaining snap ring (F).
6. Turn the snap rings in the ring grooves until the end gaps are positioned at the bottom of the piston.

PISTON RING REPLACEMENT

1. Remove the piston from the engine block (see **CRANKSHAFT AND PISTON REMOVAL**).
2. Using a ring expander (A), remove the old piston rings (B).

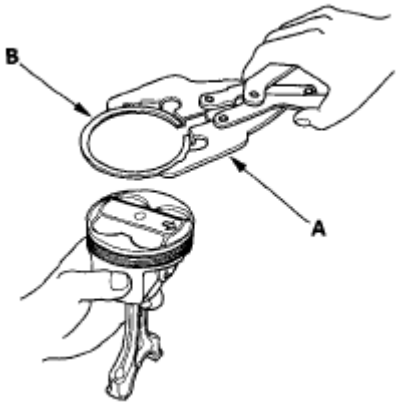


Fig. 118: Removing Piston Rings
Courtesy of AMERICAN HONDA MOTOR CO., INC.

3. Clean all ring grooves thoroughly with a squared-off broken ring or ring groove cleaner with a blade to fit the piston grooves.

   The top and 2nd ring grooves are 1.2 mm (0.05 in.) wide. The oil ring groove is 2.0 mm (0.08 in.) wide. File down a blade if necessary.

   Do not use a wire brush to clean the ring grooves, or cut the ring grooves deeper with the cleaning tools.

   NOTE: If the piston is to be separated from the connecting rod, do not install new rings yet.

4. Using a piston that has its rings removed, push a new ring (A) into the cylinder bore 15-20 mm (0.6-0.8 in.) from the bottom.

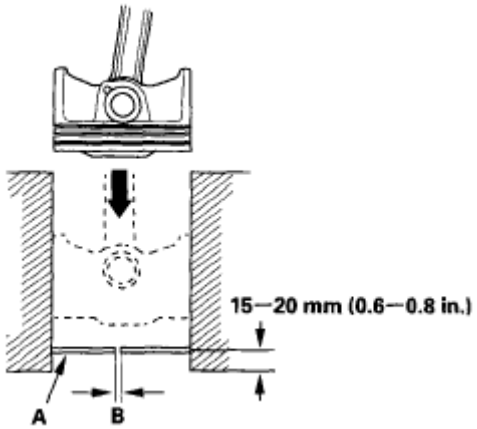


Fig. 119: Pushing Ring Into Cylinder Bore
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Measure the piston ring end-gap (B) with a feeler gauge:
   - If the gap is too small, check to see if you have the proper rings for your engine.
   - If the gap is too large, recheck the cylinder bore diameter against the wear limits (see **BLOCK AND PISTON INSPECTION**). If the bore is beyond the service limit, the engine block must be rebored.

   Piston Ring End-Gap

   Top Ring:

   Standard (New): 0.20-0.35 mm (0.008-0.014 in.)

   Service Limit: 0.60 mm (0.024 in.)

   Second Ring:

   Standard (New): 0.50-0.65 mm (0.020-0.026 in.)

   Service Limit: 0.75 mm (0.030 in.)

   Oil Ring:

   Standard (New): 0.20-0.70 mm (0.008-0.028 in.)

   Service Limit: 0.80 mm (0.031 in.)

6. Install the top ring and the second ring as shown. The top ring (A) has a 1R mark and the second ring (B) has a 2R mark. The manufacturing marks (C) must be facing upward.

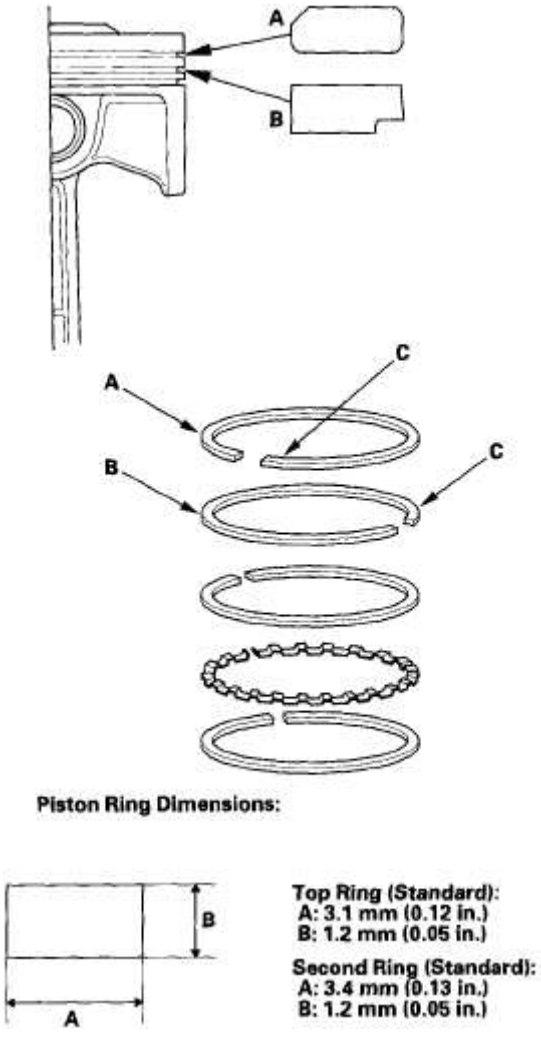


Fig. 120: Identifying Top Ring And Second Ring
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Rotate the rings in their grooves to make sure they do not bind.
8. Position the ring end gaps as shown: About 90°

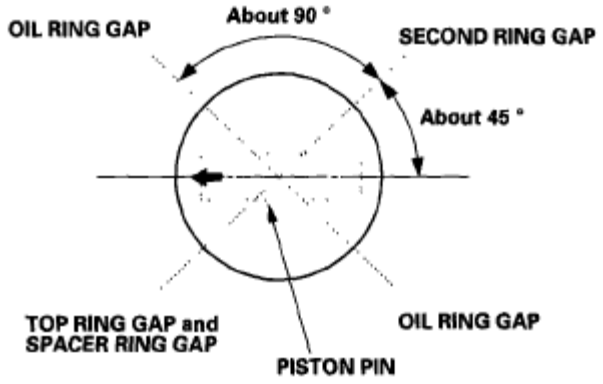


Fig. 121: Identifying Ring End Gaps Turning Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

9. After installing a new set of rings, measure the ring-to-groove clearances.

   Top Ring Clearance

   Standard (New): 0.045-0.070 mm (0.0018-0.0028 in.)

   Service Limit: 0.13 mm (0.005 in.)

   Second Ring Clearance

   Standard (New): 0.040-0.065 mm (0.0016-0.0026 in.)

   Service Limit: 0.13 mm (0.005 in.)

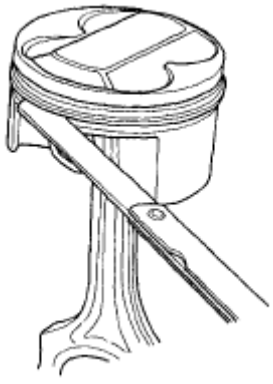


Fig. 122: Identifying Ring-To-Groove Clearances
Courtesy of AMERICAN HONDA MOTOR CO., INC.

PISTON INSTALLATION

If the Crankshaft is Already Installed

1. Set the crankshaft to bottom dead center (BDC) for each cylinder as its piston is installed.
2. Remove the connecting rod caps, then install the ring compressor. Check that the bearing is securely in place.
3. Apply new engine oil to the piston, inside of the ring compressor, and the cylinder bore, then attach the ring compressor to the piston/connecting rod assembly.
4. Position the mark (A) to face the cam chain side of the engine.

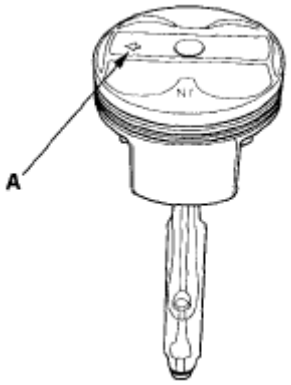


Fig. 123: Identifying Mark To Face Cam Chain Side Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A). Push down on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.

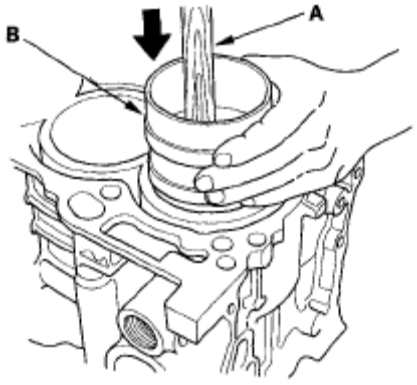


Fig. 124: Pushing Down On Ring Compressor
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing the piston into place.
7. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT**).
8. Inspect the connecting rod bolts (see **CONNECTING ROD BOLT INSPECTION**).
9. Install the rod caps with bearings. Torque the bolts to 29 N.m (3.0 kgf.m, 22 lbf.ft).
10. Tighten the connecting rod bolts an additional 90 °.

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle.

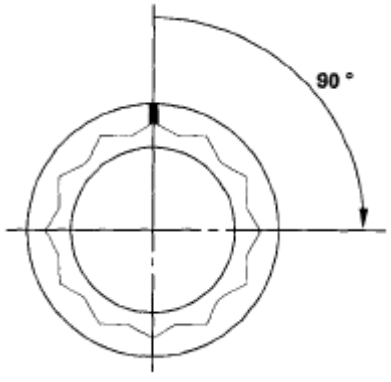


Fig. 125: Identifying Connecting Rod Bolt Tightening Angle

Courtesy of AMERICAN HONDA MOTOR CO., INC.

If the Crankshaft is Not Installed

1. Remove the connecting rod caps, then install the ring compressor, and check that the bearing is securely in place.
2. Apply new engine oil to the piston, inside of the ring compressor, and the cylinder bore, then attach the ring compressor to the piston/connecting rod assembly.
3. Position the mark (A) to face the cam chain side of the engine.

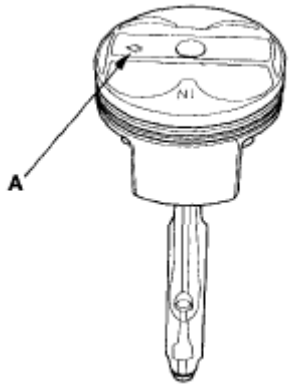


Fig. 126: Identifying Mark To Face Cam Chain Side Of Engine
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Position the piston in the cylinder, and tap it in using the wooden handle of a hammer (A). Push down on the ring compressor (B) to prevent the rings from expanding before entering the cylinder bore.

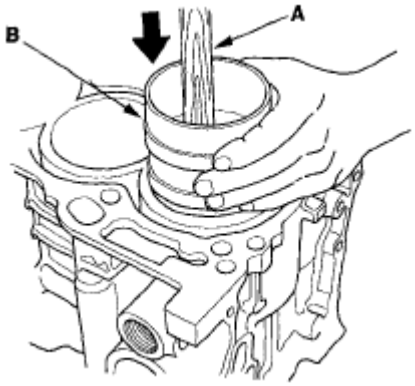


Fig. 127: Pushing Down On Ring Compressor

Courtesy of AMERICAN HONDA MOTOR CO., INC.

5. Position all pistons at top dead center (TDC).

CONNECTING ROD BOLT INSPECTION

1. Measure the diameter of each connecting rod bolt at point A and point B.

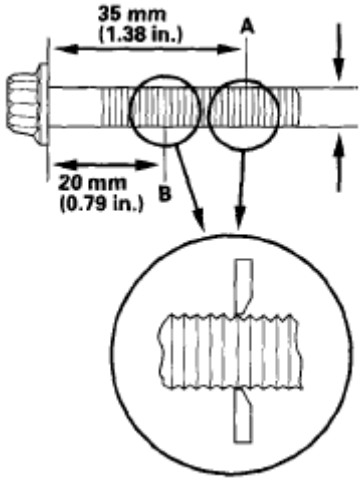


Fig. 128: Identifying Diameter Of Connecting Rod Bolt
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Calculate the difference in diameter between point A and point B.

   Point A-Point B = Difference in Diameter

   Difference in Diameter

   Specification: 0-0.1 mm (0-0.004 in.)

3. If the difference in diameter is out of specification, replace the connecting rod bolt.

CRANKSHAFT INSTALLATION

Special Tools Required

- Driver 07749-0010000

- Attachment, 24 x 26 mm 07746-0010700
- Oil seal driver attachment, 96 mm 07ZAD-PNAA100

1. Install the crankshaft end bushing when replacing the crankshaft.

   Using the special tools, drive in the crankshaft end bushing until the special tools bottom against the crankshaft.

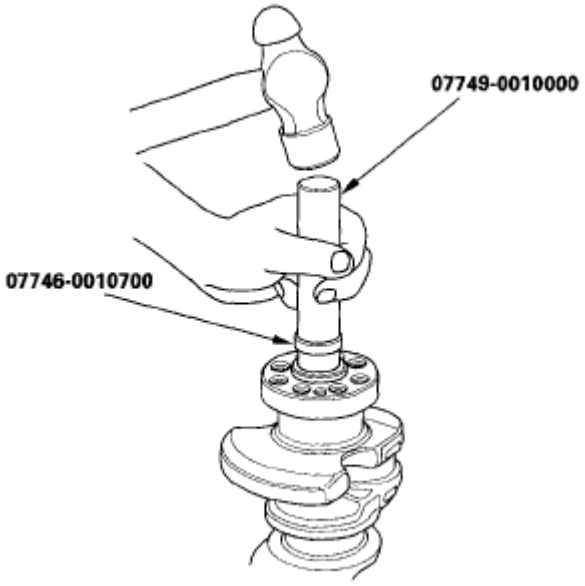


Fig. 129: Identifying Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

2. Check the connecting rod bearing clearance with plastigage (see **CONNECTING ROD BEARING REPLACEMENT**).
3. Check the main bearing clearance with plastigage (see **CRANKSHAFT MAIN BEARING REPLACEMENT**).
4. Install the bearing halves in the engine block and connecting rods.
5. Apply a coat of new engine oil to the main bearings and rod bearings.
6. Hold the crankshaft so that rod journal No. 2 and rod journal No. 3 are straight up, and lower the crankshaft into the engine block.
7. Apply new engine oil to the thrust washer surfaces. Install the thrust washers (A) in the No. 4 journal of the engine block.

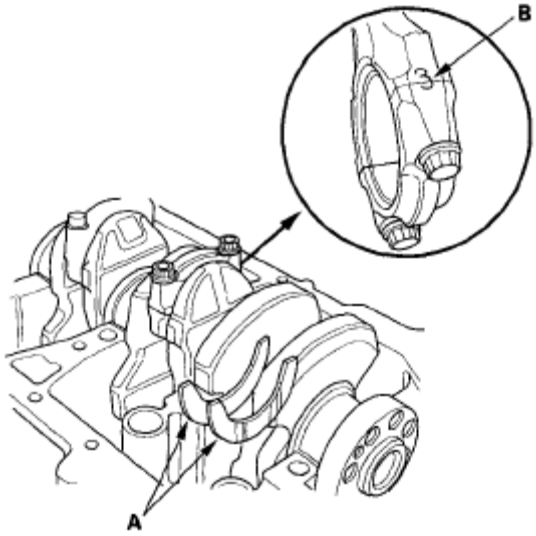


Fig. 130: Identifying Thrust Washers In Engine Block
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. Inspect the connecting rod bolts (see **CONNECTING ROD BOLT INSPECTION**).
9. Apply engine oil to the threads of the connecting rod bolts.
10. Seat the rod journals into connecting rod No. 1 and connecting rod No. 4. Line up the mark (B) on the connecting rod and cap, then install the caps and bolts finger-tight.
11. Rotate the crankshaft clockwise, and seat the journals into connecting rod No. 2 and connecting rod No. 3. Line up the mark on the connecting rod and cap, then install the caps and bolts finger-tight.
12. Tighten the connecting rod bolts to 29 N.m (3.0 kgf.m, 22 lbf.ft).
13. Tighten the connecting rod bolts an additional 90 °.

NOTE: Remove the connecting rod bolt if you tightened it beyond the specified angle, and go back to step 8 of the procedure. Do not loosen it back to the specified angle.

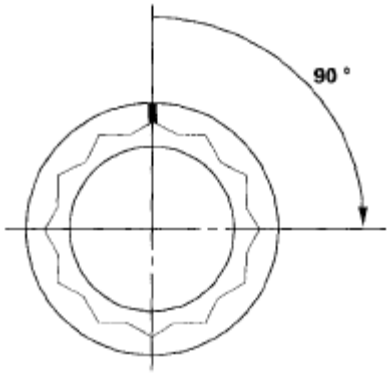


Fig. 131: Identifying Connecting Rod Bolt Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

14. Remove all of the old liquid gasket from the lower block mating surfaces, bolts, and bolt holes.
15. Clean, and dry the lower block mating surfaces.
16. Apply liquid gasket, P/N 08717-0004, 08718-0001, 08718-0002, 08718-0003, or 08718-0009, evenly to the engine block mating surface of the lower block.

NOTE: Do not install components if too much time has passed after applying the liquid gasket (for P/N 08718-0002, no more than 4 minutes, for all others, no more than 5 minutes). Instead, remove the old residue and reapply the liquid gasket.

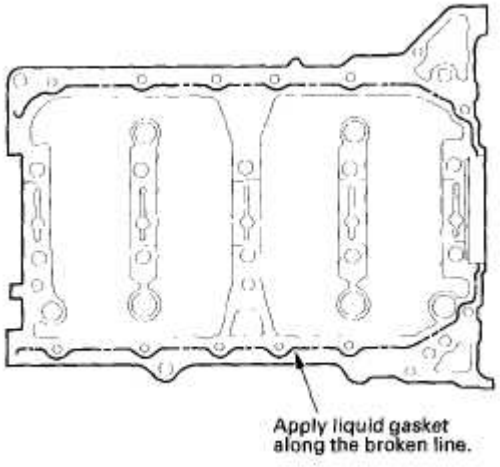


Fig. 132: Identifying Lower Block

Courtesy of AMERICAN HONDA MOTOR CO., INC.

17. Put the lower block on the engine block.
18. Apply new engine oil to the threads of the bearing cap bolts.
19. Tighten the bearing cap bolts, in sequence, to 29 N.m (3.0 kgf.m, 22 lbf.ft).

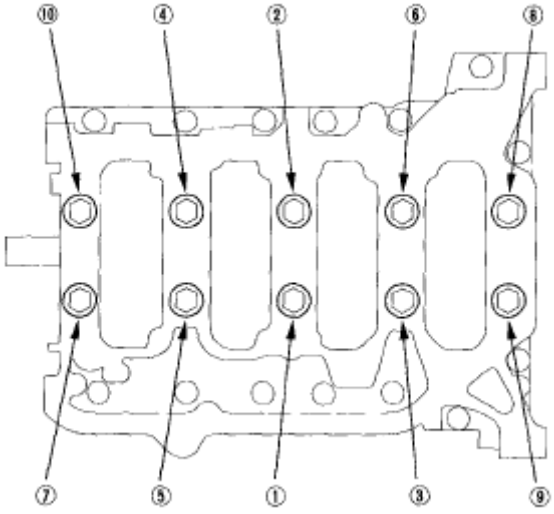


Fig. 133: Identifying Bearing Cap Bolts Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

20. Tighten the bearing cap bolts an additional 56 °.

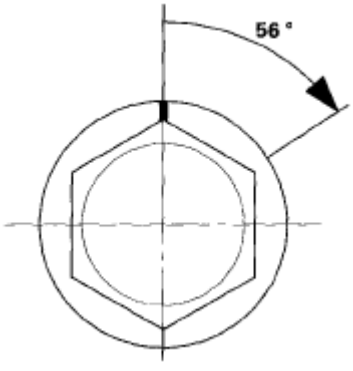


Fig. 134: Identifying Bearing Cap Bolts Tightening Angle
Courtesy of AMERICAN HONDA MOTOR CO., INC.

21. Tighten the 8 mm bolts, in sequence, to 22 N.m (2.2 kgf.m, 16 lbf-ft).

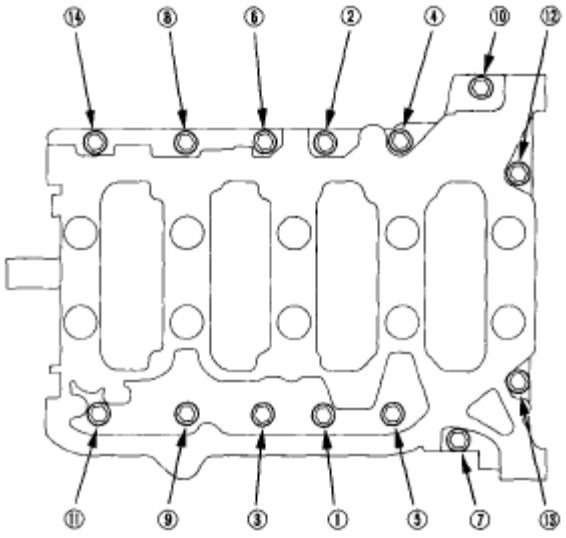


Fig. 135: Identifying Crank Shaft Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

22. Use the special tools to drive a new oil seal squarely into the engine block to the specified installed height.

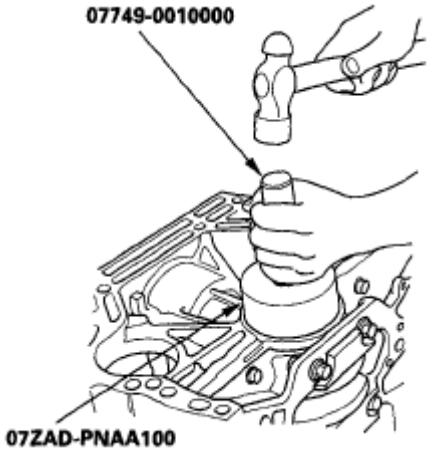


Fig. 136: Identifying Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

23. Measure the distance between the engine block (A) and oil seal (B).

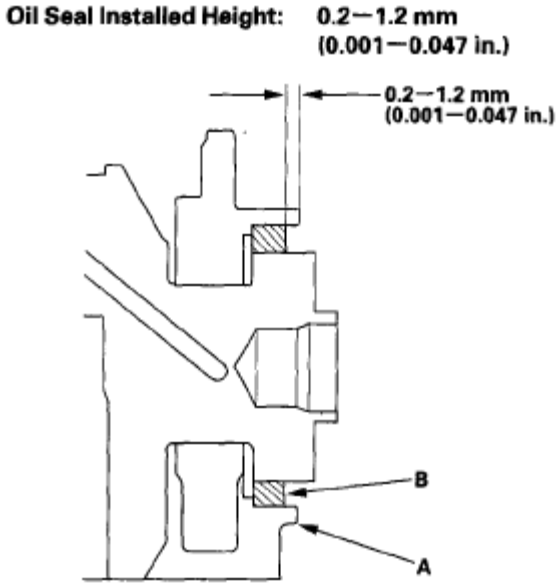


Fig. 137: Identifying Distance Between Engine Block And Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

24. Install the baffle plates.

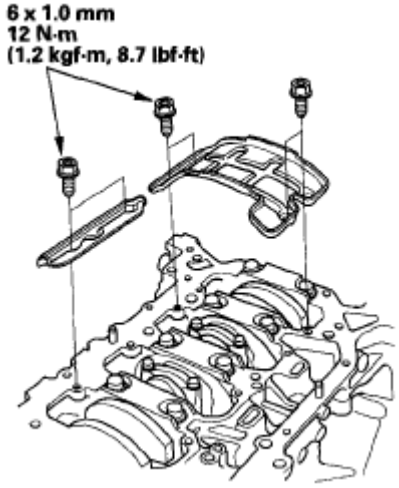


Fig. 138: Identifying Baffle Plates (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

25. Install the oil pump (see **OIL PUMP INSTALLATION**).
26. Install the oil pan (see **OIL PAN INSTALLATION**).
27. Install the cylinder head (see **CYLINDER HEAD INSTALLATION**).

28. Install the flywheel , clutch disc and pressure plate (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (6-SPEED MODEL)**).
29. Install the transmission (see **TRANSMISSION INSTALLATION**).
30. Install the engine assembly (see **ENGINE INSTALLATION**).

NOTE: Whenever any crankshaft or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idle speed until it reaches normal operating temperature, then continue to running it for about 15 minutes.

OIL PAN INSTALLATION

1. Remove all of the old liquid gasket from the oil pan mating surfaces, bolts, and bolt holes.
2. Clean, and dry the oil pan mating surfaces.
3. Apply liquid gasket, P/N 08717-0004,08718-0001, 08718-0002,08718-0003, or 08718-0009, evenly to the lower engine block mating surface and to the inside edge of the bolt holes.

NOTE: Do not install components if too much time has passed after applying the liquid gasket (for P/N 08718-0002, no more than 4 minutes, for all others, no more than 5 minutes). Instead, remove the old residue and reapply the liquid gasket.

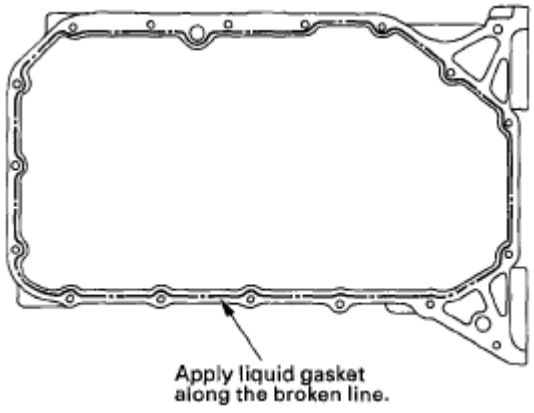


Fig. 139: Identifying Lower Engine Block Mating Surface
Courtesy of AMERICAN HONDA MOTOR CO., INC.

4. Install the oil pan.
5. Tighten the bolts in two or three steps. In the final step, tighten all bolts, in sequence, to 12 N.m (1.2 kgf.m, 8.7 lbf.ft). Wipe off the excess liquid gasket on the each side of crankshaft pulley and flywheel.

NOTE:

- **Wait at least 30 minutes to allow liquid gasket to cure before filling the engine with oil.**
- **Do not run the engine for at least 3 hours to allow liquid gasket to cure after installing the oil pan.**

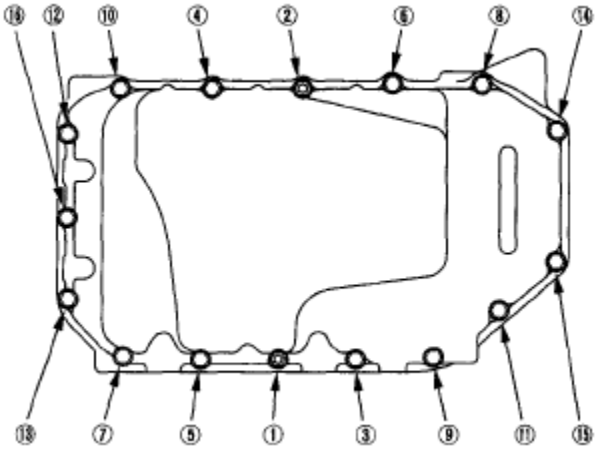


Fig. 140: Identifying Oil Pan Bolt Tightening Sequence
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Install the transmission mounting bolts (A) and clutch cover (B).

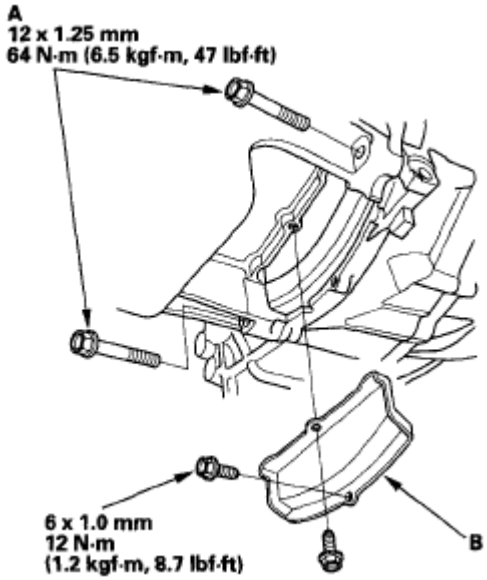


Fig. 141: Identifying Transmission Mounting Bolts And Clutch Cover (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the lower torque rod bracket.

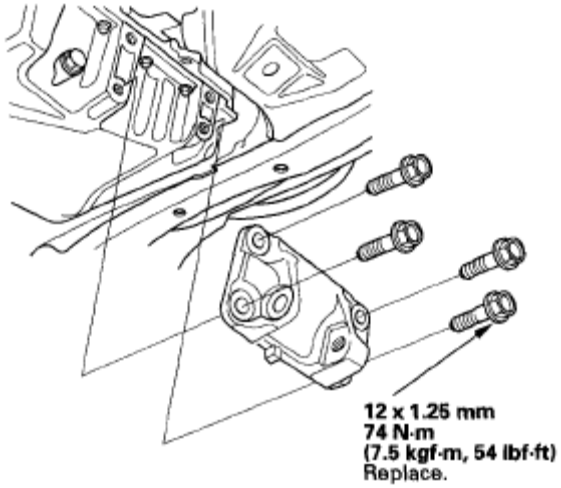


Fig. 142: Identifying Lower Torque Rod Bracket (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.

8. If the engine still in the vehicle, do the following steps.
9. Support the front subframe with the front subframe adapter and a jack, and lift

it up to the body.

10. Loosely install the new front subframe mounting bolts (see step 13 on **ENGINE INSTALLATION**).
11. Align all reference marks on the front subframe with the body, then tighten the bolts on the front subframe to the specified torque (see step 14 on **ENGINE INSTALLATION**).
12. Remove the jack and front subframe adapter.
13. Tighten the new front subframe mid-stiffener mounting bolts on both side (see step 16 on **ENGINE INSTALLATION**).
14. Lower the vehicle on the lift.
15. Loosen the upper torque rod mounting bolt (see step 5 on **ENGINE INSTALLATION**).
16. Raise the vehicle on the lift.
17. Install the lower torque rod, then tighten the new lower torque rod mounting bolts in the numbered sequence shown (see step 17 on **ENGINE INSTALLATION**).
18. Loosely tighten the new front mount mounting bolt (see step 18 on **ENGINE INSTALLATION**).
19. Lower the vehicle on the lift.
20. Tighten the upper torque rod mounting bolt (see step 21 on **ENGINE INSTALLATION**).
21. Raise the vehicle on the lift to full height.
22. Tighten the front mount mounting bolt (see step 23 on **ENGINE INSTALLATION**).
23. Install the stiffener, then tighten the steering gearbox mounting bolt and stiffener mounting bolt. Install the harness clamp from the front subframe (see step 25 on **ENGINE INSTALLATION**).
24. Install the steering gearbox bracket. Install the stiffener, then tighten the steering gearbox mounting bolt and stiffener mounting bolt (see step 27 on **ENGINE INSTALLATION**).
25. Connect the lower arms to the knuckles (see step 5 on **LOWER ARM REMOVAL/INSTALLATION**).

26. Connect the stabilizer links (see **STABILIZER LINK REMOVAL/INSTALLATION**).
27. Install the splash shield (see step 35 on **ENGINE INSTALLATION**).

TRANSMISSION END CRANKSHAFT OIL SEAL INSTALLATION - IN CAR

Special Tools Required

- Driver 07749-0010000
- Oil seal driver attachment 96 07ZAD-PNAA100

1. Remove the transmission (see **TRANSMISSION REMOVAL**).
2. Remove the pressure plate , clutch disc and flywheel (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (5-SPEED MODEL)**).
3. Clean, and dry the crankshaft oil seal housing.
4. Apply a light coat of multipurpose grease to the crankshaft and to the lip of the seal.
5. Use the special tools to drive a new oil seal squarely into the engine block to the specified installed height.

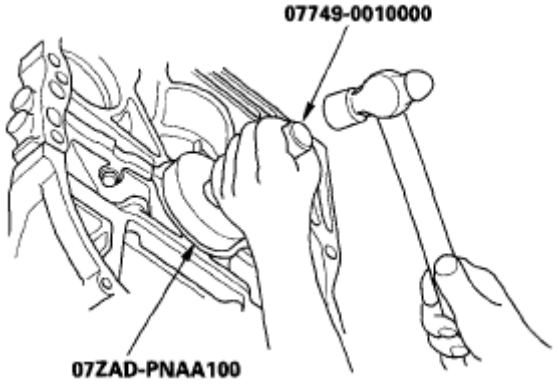


Fig. 143: Identifying Special Tool
Courtesy of AMERICAN HONDA MOTOR CO., INC.

6. Measure the distance between the engine block (A) and oil seal (B).

Oil Seal Installed Height: 0.2-1.2 mm (0.001-0.047 in.)

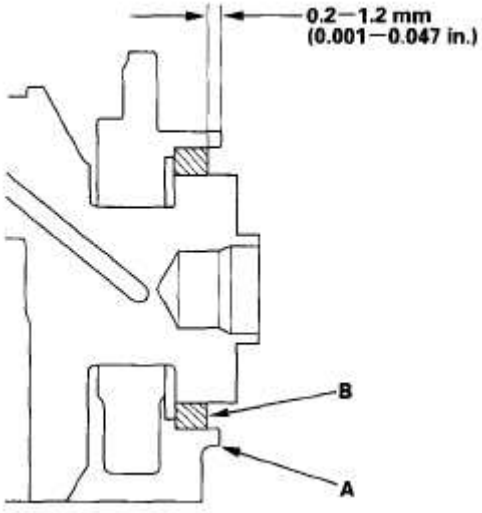


Fig. 144: Identifying Distance Between Engine Block And Oil Seal
Courtesy of AMERICAN HONDA MOTOR CO., INC.

7. Install the flywheel, clutch disc , and pressure plate (see **PRESSURE PLATE AND CLUTCH DISC REMOVAL (6-SPEED MODEL)**).
8. Install the transmission (see **TRANSMISSION INSTALLATION**).

SEALING BOLT AND JOINT PIPE INSTALLATION

NOTE:

- **When installing the sealing bolt, always use a new washer.**
- **When installing the joint pipe, always use a new O-ring.**

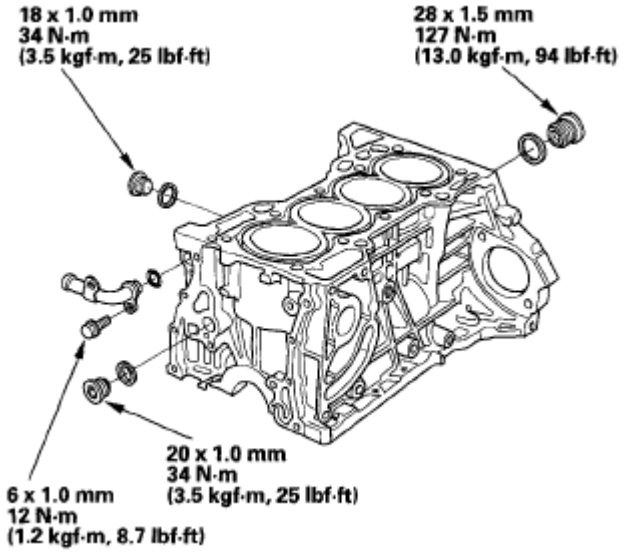


Fig. 145: Identifying Sealing Bolt And Joint Pipe (With Torque Specifications)
Courtesy of AMERICAN HONDA MOTOR CO., INC.